BLM LIBRARY
88028852

THE INTERIOR
ANAGEMENT

RARE PLANTS AND NATURAL PLANT COMMUNITIES

A Strategy for the Future

QK
86
.L362
1992

Fish & Wildlife 2000

National Strategy Plan Series

National Strategy Plans

Component plans include implementation strategies for the specific goals and objectives outlined in *Fish and Wildlife 2000—A Plan for the Future.*

Fish

Fisheries Habitat Management
Anadromous Fish Habitat Management
Special Status Fishes Habitat Management

Wildlife

Waterfowl Habitat Management
Wetlands Environment Today & Tomorrow
Desert Bighorn Sheep Habitat Management
Raptor Habitat Management
Watchable Wildlife
Upland Game Bird Habitat Management
Nongame Migratory Bird Habitat Conservation Plan
Big Game Habitat Management

Plants

Rare Plants and Natural Plant Communities

Threatened/Endangered Species

Rare Plants and Natural Plant Communities
Desert Tortoise Habitat Management
Special Status Fishes Habitat Management

Administrative

Wildlife and Fisheries Information System
Career Management Team Findings for Wildlife and Fisheries Biologists
Training BLM Wildlife and Fisheries Program Personnel
Staffing for the BLM Wildlife and Fisheries Program

#27689409
ID 88028852
QK
86
.L362
1992

Rare Plants and Natural Plant Communities
A Strategy for the Future

BLM LIBRARY
SC-653, BLDG. 50
DENVER FEDERAL CENTER
P. O. BOX 25047
DENVER, CO 80225-0047

Prepared by:

W.
John Willoughby, Team Leader
Botanist, California State Office

L.
Ed Hastey, Advisor
State Director, California State Office

Ken Berg
Endangered Plant Program Manager
California Department of Fish and Game
(also representing the California Native Plant Society)

Phillip L.
Phil Dittberner
Botanist, Service Center

Ronald D.
Ron Fellows
District Manager
Bakersfield District Office
(at the time of participation was
Area Manager, Farmington Resource Area)

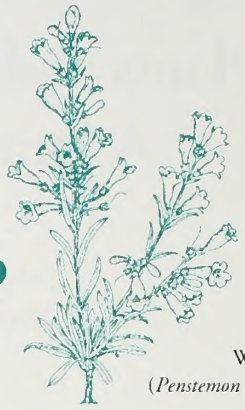
Russell N.
Russ Holmes
Botanist, Roseburg District Office

Jan Knight
Botanist
U.S. Fish and Wildlife Service
Sacramento, California
(at the time of participation was
Botanist, New Mexico State Office)

William H.
Bill Radtkey
Leader, Southwest T/E Species Staff
Arizona State Office

D.
Roger Rosentreter
Botanist, Idaho State Office

Sowing Seeds of Stewardship



White River penstemon
(*Penstemon scariosus* var. *albifluvis*)
by Kaye H. Thorne

Dear Secretary Lujan:

The fish, wildlife, and plant resources found on public lands administered by the Bureau of Land Management (BLM) are among America's great natural treasures. BLM-managed land covers nearly one third of a billion acres and provides habitat to more than 3,000 species of mammals, birds, reptiles, fish, and amphibians, and far more than 10,000 species of vascular plants. With its mandate of multiple use, BLM's responsibilities are complex in managing these spectacularly diverse habitats that encompass mesas, rock canyons, towering mountain peaks, sundrenched deserts, pristine lakes, fast flowing rivers, evergreen forests, ocean cliffs, and arctic plains.

The BLM manages these valuable fish, wildlife, and plant resources through its strategic plan, *Fish and Wildlife 2000*, which sets goals and objectives for BLM's programs. Management plans are developed at the national level and BLM field level to make these goals a reality. Taken as a whole, these plans provide a blueprint for managing fish, wildlife, and plant resources into the 21st century and beyond.

The Rare Plants and Natural Plant Communities Strategy Plan is an important component of the BLM's *Fish and Wildlife 2000*. It represents one of the many BLM strategies to restore and enhance the fish, wildlife, and plant resources on our Nation's public lands.

Cy Jamison

Cy Jamison, Director
Bureau of Land Management
U.S. Department of the Interior

The Bureau of Land Management is responsible for the balanced management of Public Lands and resources and their various values so that they are considered in a combination that will best serve the needs of the American people. Management is based upon the principles of multiple use and sustained yield; a combination of uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources. These resources include recreation, range, timber, minerals, watershed, fish and wildlife, wilderness, and natural, scenic, scientific and cultural values.

Contents

Executive Summary 1

Introduction 5
- Importance of Plants and Natural Plant Communities 6
- Importance of Biological Diversity 9
- Importance of this Strategy to the Conservation of Biological Diversity 10

Background and Current Management 13

Management Strategies for the Future 21
- Special Status Plants 22
  - Goal 1. Inventory 22
  - Goal 2. Planning 25
  - Goal 3. Monitoring and Research 30
  - Goal 4. Coordination 33
- Natural Plant Communities 35
  - Goal 1. Policy 35
  - Goal 2. Inventory and Monitoring 36
  - Goal 3. Planning 38
  - Goal 4. Coordination 39
- Personnel 41
  - Goal 1. Adequate Staffing 41
- Awareness 44
  - Goal 1. Promote Program Support 44

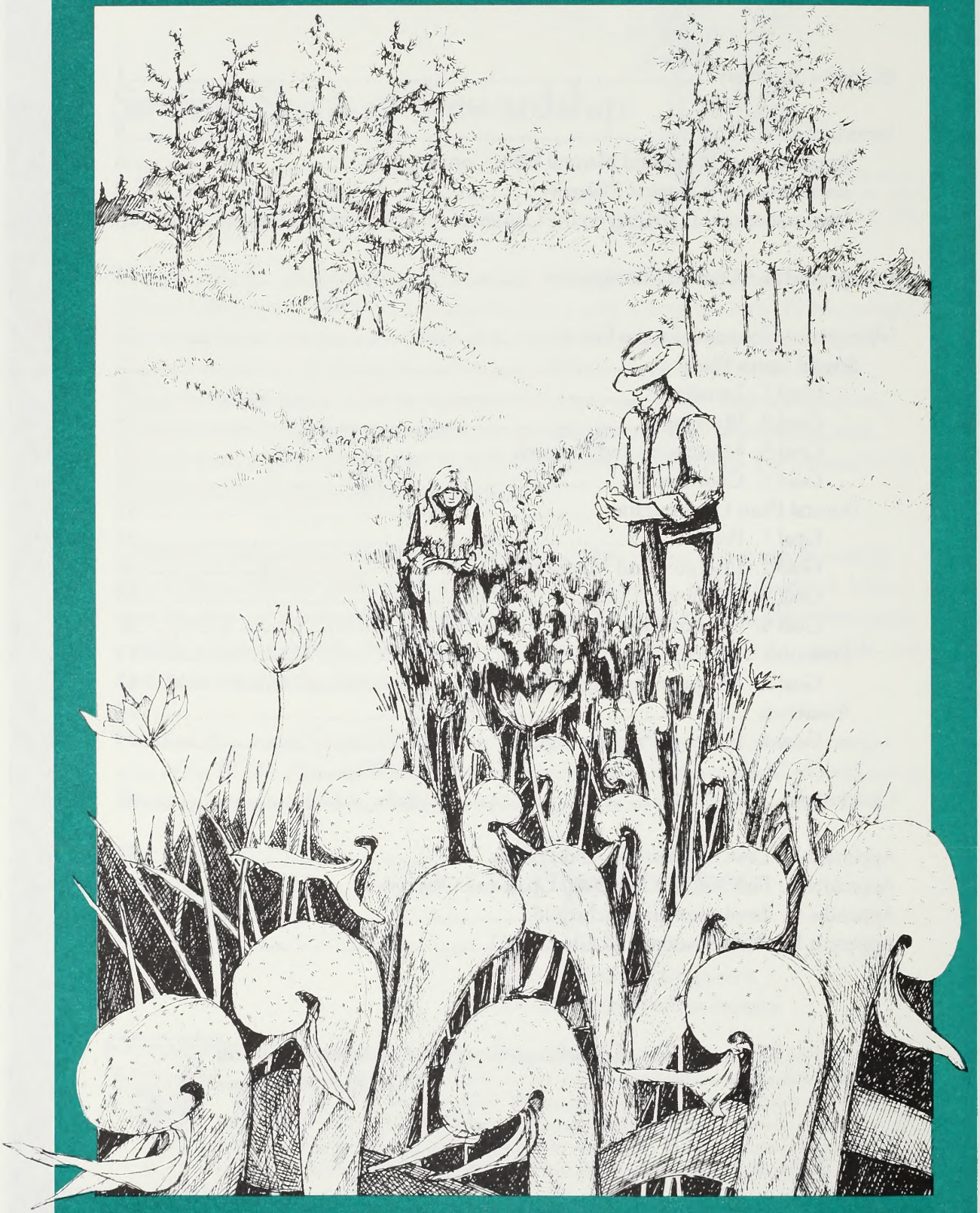
Conclusions 49

Appendix A. Laws, Regulations, and Policies 52
Appendix B. Fish and Wildlife 2000 Goals and Objectives 53
Appendix C. Implementation Schedule 55
Appendix D. Abbreviations and Glossary 58

Cover drawing of dwarf bear-claw poppy (*Arctomecon humilis*)
by Kaye H. Thorne

BLM-CA-PT-92-018-6850

Executive Summary



M. L. Herring

This strategic plan identifies resource opportunities and actions required to accomplish the national goals and objectives for special status plants and natural plant communities as outlined in *Fish and Wildlife 2000.* This strategic plan was developed in 1990 and 1991 by a professional team composed of Bureau of Land Management (BLM) managers and botanists and a representative of the California Native Plant Society.

The 270 million acres of public lands managed by the BLM in the 13 western states covered by this plan provide habitat for more than 1,100 special status plants. The great biological diversity of these BLM lands is also reflected in the fact that almost 750 natural plant communities have been designated or proposed for designation as special areas. Clearly, the special status plants and natural plant communities found on BLM lands contribute greatly to the biological diversity of the West.

The BLM has given considerable emphasis in recent years to the management of special status plants and natural plant communities. This is reflected in the increases over the past several years in personnel assigned to manage these resources and in funds allocated for this purpose. A core staff has made significant accomplishments.

The following actions have been completed. For special status plants, 16 percent of the necessary inventory has been completed, 18 percent of the activity plans have been prepared, and 10 percent of the research and studies needed have been conducted. Thirteen percent of these plants are being monitored. For natural plant communities, 34 percent of the inventory work has been completed, 26 percent of the activity plans have been developed, and 20 percent of proposed research and studies have been conducted. Thirty-two percent of all designated natural plant communities are being monitored.

Although significant progress has been made in managing these important resources, considerable work remains to ensure their conservation. This plan provides the strategy necessary to ensure that the BLM meets its conservation goals for rare plants and natural plant communities.

The team identified a number of specific strategies to achieve the *Fish and Wildlife 2000* objectives. These are summarized below.

Special Status Plants

Inventory. Complete inventories on 101 million acres to determine the distribution and condition of special status plants on BLM lands.

Planning. Develop and implement 498 activity plans for special status plants. Implementation includes the construction of habitat improvement projects to benefit 244 plant species and the acquisition of 105,000 acres of important habitat. It is anticipated that most of this acquisition can be accomplished through land exchanges. Acquisition efforts will comply with the Director's "no net gain" policy, whereby the total area of BLM lands will not increase.

Monitoring and Studies. Initiate monitoring on the 87 percent of those special status plants not currently being monitored. Develop monitoring standards and a technical reference on monitoring techniques. Conduct 532 studies to define the biological and ecological needs of special status plants and to establish the recovery actions needed.

Coordination. Ensure that special status plant management is consistent across jurisdictional and political boundaries through increased interagency and intergroup coordination.

Natural Plant Communities

Inventory and Monitoring. Conduct inventories on 12 million acres of BLM lands to identify natural plant communities that qualify for special area designation and to acquire baseline information. Monitor 747 natural plant communities.

Planning. Develop and implement 325 activity plans for natural plant community management. Construct habitat improvement projects to benefit 176 natural plant communities and acquire 93,000 acres of lands identified in land use plans as necessary for the conservation of natural plant communities. It is anticipated that most of this acquisition can be accomplished through land exchanges (following the Director's "no net gain" policy). Conduct 172 studies to increase understanding of natural plant communities and improve management capabilities for these areas.

Coordination. Develop procedures for cooperative studies and research and organize and participate in state, regional and national interagency workshops to address identification and management of natural plant communities.

Personnel

Increase to 145 the qualified staff assigned to rare plant and natural plant community management. The staff should consist of specialists skilled in plant taxonomy and plant ecology.

Awareness

Increase awareness of the special status plant and natural plant community programs through development and implementation of outreach plans in each state.

green-banded mariposa (*Calochortus macrocarpus*)
by Gayle Houston

Introduction

Daniel Lee Brown

Worldwide, about 250,000 species of higher plants have been described. Many additional plants, currently unknown to science, remain to be discovered. Although most of these yet-to-be-discovered plants are in the tropics, new species can be found even in temperate areas that have been well studied by many botanists over long periods of time. Even in heavily populated California, for example, at least 219 new plants have been discovered since 1959.

Human activities have taken a substantial toll on the great plant diversity of our planet. Although natural extinctions have occurred throughout the period of life on earth, extinction *rates* have been greatly accelerated by humanity. These rates are estimated to be 1,000 to 10,000 times higher than before human intervention. The result is that the earth may be losing — forever — one plant species every hour. By the year 2000 it is expected that 15 to 25 percent of all higher plant species will be extinct, many before they are even discovered. Although the greatest (and most publicized) losses of plant species are in tropical regions, temperate areas have their share of problems as well. At least one in five native plant species in Europe is in some degree of jeopardy, and half of all plants in some regions of that continent are threatened.

In the United States, 214 plant species have become extinct in recent years. To stem this tide, 250 U.S. plants have been listed as threatened or endangered through the Endangered Species Act of 1973, as amended. More than 2,000 additional U.S. plant species are in sufficient jeopardy to be considered candidates for listing as threatened or endangered.

The purpose of this strategic plan for special status plants and natural plant communities is to identify resource opportunities and actions required to accomplish the national goals and objectives outlined in *Fish and Wildlife 2000.* Recovery of threatened and endangered plants is one of the major goals of *Fish and Wildlife 2000* and is one of the BLM's most important responsibilities. Equally important is to take action to prevent the need to list additional plant species.

This plan was developed in 1990 and 1991 by a team of BLM managers and botanists and a representative of the California Native Plant Society.

Importance of Plants and Natural Plant Communities [1]

Plant species and natural plant communities are important to humans for many reasons, including:

Aesthetics. Plants have great aesthetic value, both in their native habitats (plant communities) and in cultivation. How many of us would be willing to live without the plants around us, including the forests, woodlands, and grasslands surrounding our towns and cities, as well as the plants found in and around our homes and businesses? Only a small percentage of the world's plants have been used for ornamental purposes. Many more await discovery and cultivation.

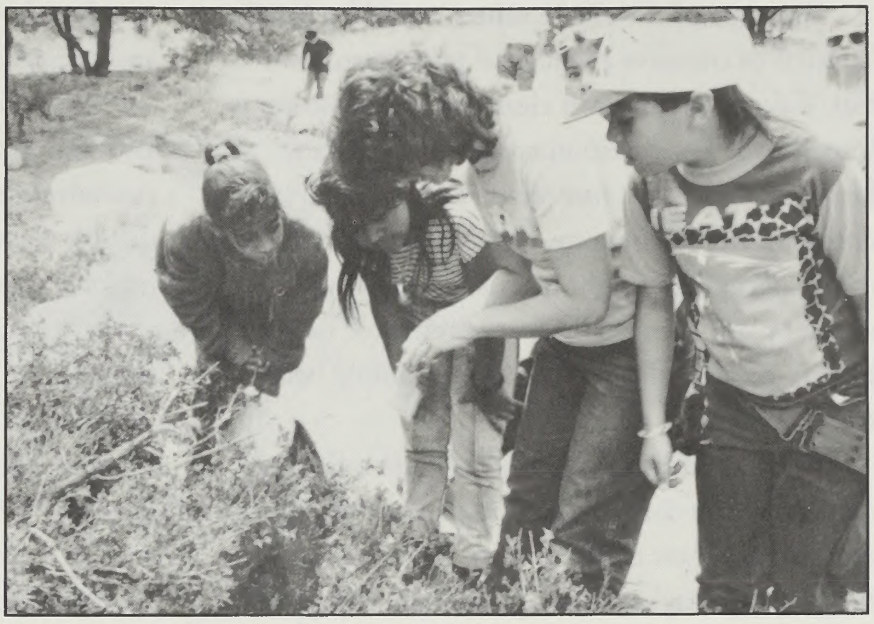
Medicine. Throughout history plants have been of paramount importance to medicine. In fact, 25 percent of all prescriptions written annually in the United States contain chemicals from higher plants. Another 13 percent contain products from lower or microbial plants. Most of the remaining prescriptions are composed of synthesized drugs. But a large proportion of those drugs now synthesized were first discovered from plant sources. One of the most important groups of medicines is the so-called wonder drugs (antibiotics). Of all the wonder drugs of major importance only one class — the sulfa drugs — was wholly of synthetic discovery; all others, even those now synthesized, were discovered first from plant sources.

The use of plants in medicine has increased rapidly in recent years. Between 1950 and 1960, for example, the sale of drugs from plant sources increased five times. Pharmaceutical firms annually spend large amounts of money in pursuit of new medicinal plants. In spite of these efforts, however, only two percent of the world's plant species have been analyzed even for one group of plant chemicals, the alkaloids. Many more such drugs remain to be found. Any one could be as useful as vincristine, derived from the Madagascar periwinkle, which has increased the survival rate of children with leukemia from 20 percent to 80 percent. Another extremely promising anti-cancer drug is taxol, derived from the bark of the Pacific yew. In clinical trials taxol has worked against a broad range of cancers, including colon, lung, ovarian and mammary tumors, and leukemia. Further research on taxol is being conducted, and a major effort is underway to synthesize it. Because it takes about 60,000 pounds of the bark from 12,000 trees to produce 2.5 pounds of taxol, synthesis will be the only means of obtaining sufficient quantities of the drug for widespread treatment.

Food. Although some 3,000 species of plants have been used by humans for food, only 150 of these have been grown commercially to any extent. Three species of grass — rice, wheat, and corn — are by far the most important food plants. These, and less than 20 other plant species, serve as food for most of humanity. Study will undoubtedly reveal many additional plants that can — through breeding — be useful as food. As climates change or more resistant pests become prevalent, it may be necessary to switch to some of these new food sources — that is, if they still

[1] This discussion draws heavily upon several sources including: P. and A. Ehrlich, *Extinction*, Random House, New York, 1981; H. Koopowitz and H. Kaye, *Plant Extinction: A Global Crisis*, Stone Wall Press, Washington, D.C., 1984; O. Tippo and W.L. Stern, *Humanistic Botany*, Norton & Co., New York, 1977; and E.O. Wilson (ed.), *BioDiversity*, National Academy Press, Washington, D.C., 1988.

survive. Even for those plants currently used for food, conservation of wild populations is crucial to ensure there is genetic variability for these plants to adapt to changing environments or to develop resistance to animals and microorganisms that may attack them. For example, teosinte, a rare perennial corn from Mexico, has been shown to be resistant to seven of the nine viruses that plague commercial varieties of corn. Plants are also the source of the animal products we consume, such as beef, milk, and fish.



Margie Guzman

Industrial Products. Plants are immensely important for the consumer goods they provide. The paper for this document and the wood used to build our structures are dependent both on the particular plant species involved and the plant communities that support these plants. Fibers from plants provide clothing. Future fuel needs may also be met by plants, whether it be hydrocarbons derived from such species as gopher plant or alcohols derived from the sugars contained in plants such as sugar cane. While many of the most important industrial products come from relatively common plants, rare and uncommon plants have provided exotic substances ranging from insect repellent to lubricants. Many potential uses of rare plants await discovery. About 85 percent of Federally listed and candidate plants are related to species of already known economic use.

Recreation. Plant communities form the basis for many important recreational activities, including hiking, fishing, hunting, photography, and nature observation.

Air Quality. The oxygen in the air we breathe is derived from the photosynthesis of plants. The quality of the air can be greatly influenced by plants. Vegetation can restrict the movement of dust and pollutants, and plants — through their intake of carbon dioxide — can ameliorate the greenhouse effect resulting from the burning of fossil fuels.

Water Quality. Plants are extremely important to the quality of the water we use. A diverse cover of plants aids in maintaining healthy watersheds, streams, and lakes by holding soil in place, regulating stream flows, and filtering sediments from water.

Soil Maintenance. Without adequate plant cover, the thin mantle of soil on which our existence depends will erode away, either by wind or water.

Climate. Regional climates are influenced by plant cover. Forests and marshes, for example, can greatly moderate local climates. Recent droughts and resulting famines in Africa have been attributed to the destruction of forests on that continent.

Fish and Wildlife Habitat. Plants and plant communities provide the habitat necessary to sustain wildlife and fish populations. Plant communities are the basis for virtually all terrestrial animal life.

Any one of the above values would be reason by itself to conserve plants and plant communities. Taken together it is clear that conservation is imperative. The question could still be asked, however, "why save *rare* plants and *natural* plant communities?" To many, this is a matter of ethics: every species has a right to exist and, likewise, natural plant communities are preferable to human created plant communities simply because they are natural.

It is also clear that human welfare is dependent upon the conservation of *all* plant species and natural plant communities. Who is to say that the plant species lost through human negligence would not have provided tomorrow's cure for cancer or supplied the primary food source for future generations? Rare plants may be important indicators of change. They can also provide clues to past environments.

Natural plant communities provide the most stable ecosystems, those best equipped to protect soils, furnish habitat for wildlife, and perform the other functions listed above. That is not to say that natural plant communities cannot be managed to provide a variety of uses and products or that rare plants cannot coexist with other uses of wildlands. But it does mean that the conservation of these resources needs to be paramount in our management of wildlands.

Conservation of natural plant communities is one way to address the long-range problem of conserving species of both animals and plants. Natural plant communities are valuable for many reasons; one of the most important of these is that they support endangered or threatened species. Since we do not now (and probably never will) possess sufficient understanding of the requirements of all — or even most — rare plants and animals, a long-term solution for conserving such species is to maintain the natural plant communities of which they are a part. In general, conserving natural plant communities will in the long run help us recover species currently in jeopardy, avoid pushing more species towards extinction, and preserve biological diversity.

Natural, undisturbed plant communities are also important as Research Natural Areas, serving as controls against which management of similar disturbed communities can be evaluated. For this reason it is important to preserve good examples of every major plant community in an undisturbed state, even those that are common.

This strategy focuses on natural plant communities, defined as those plant communities that have not been substantially altered by human activity or that are managed to minimize the adverse effects of human disturbance. Note that this definition does not state that a natural plant community must show *no* signs of human activity or that the effects of human disturbance must be *eliminated.* Probably nowhere in the West is it possible to find a plant community that could meet the latter definition. Alien plants such as cheatgrass and red brome have become naturalized and are now ubiquitous throughout much of the West. While the importance of alien plants in a natural plant community might be reduced, it is doubtful they could ever be eliminated. A natural plant community chosen for special management designation should be among the best representative stands of that community type. If the best remaining stands all show considerable evidence of human activities, then the best of these should be chosen and managed to reduce these effects.

Once designated for special management, natural plant communities are managed in concert with the natural processes under which those particular communities evolved. For some natural plant communities it may be necessary to exclude particular uses. Others may require more intensive management such as prescribed burning to simulate wildfire. The management of all such natural plant communities requires careful planning, with consideration given to the principles of reserve design.

Pine Hill flannelbush (*Fremontodendron decumbens*)
by Mary Ann Showers

Importance of Biological Diversity [2]

Biological diversity is the variety of life and its processes. It often is divided into four major levels: 1) *genetic diversity*, the variety within a particular population or species of plant or animal; 2) *species diversity*, the variety of kinds of plants and animals; 3) *community and ecosystem diversity*, the variety of ways that species of plants and animals are naturally assembled in groups; and 4) *process diversity*, the variety of physical, chemical, and biological forces to which the other types of diversity must respond.

The recently published Keystone Policy Dialogue recognizes that biological diversity is vitally important for several reasons. Some of these reasons, including the importance of biological diversity as a source of medicines and the need to maintain wild relatives of our economically important plant species, have already been discussed. Three additional reasons to conserve biological diversity are:

- It supports the integrity and resilience of ecological systems on which humans depend and provides the genetic variation necessary for the continued evolution of new forms of life.
- Its intrinsic value.
- It adds variety and interest to our daily lives, thereby enhancing our appreciation and aesthetic enjoyment of nature.

[2] This discussion is based on the following sources: Anonymous, *Biological Diversity on Federal Lands: Report of a Keystone Policy Dialogue*, The Keystone Center, Keystone, Colorado, 1991; and J. Dennis and M. Ruggiero, Conserving Biological Diversity, *Trends*, Vol. 27, No. 4, U.S. Department of the Interior, National Park Service, Washington, D.C., 1990. The definitions of the four levels of biological diversity are taken nearly verbatim from the latter source.

Importance of this Strategy to the Conservation of Biological Diversity

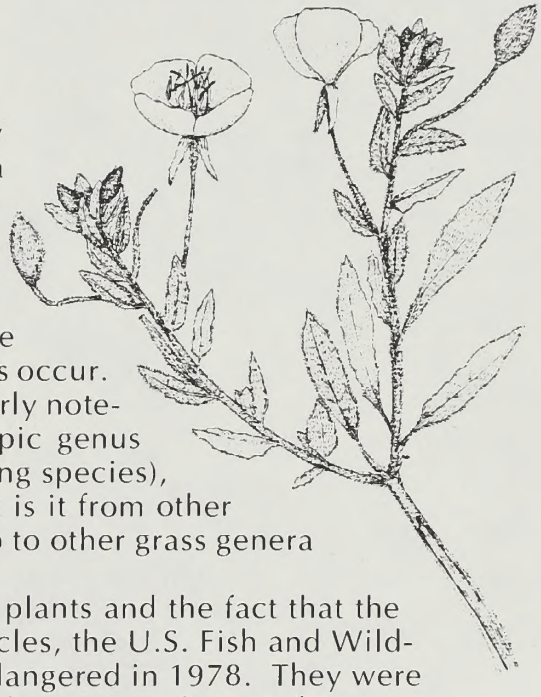
Implementing this strategy will conserve much of the biological diversity found on BLM lands in the West. Conserving the BLM's special status plants is a necessary step toward maintaining species diversity on the lands managed by the BLM (of course, special status animals, as well as more common species of both plants and animals, must also be conserved).

Perhaps even more important to the overall conservation of biological diversity is the conservation of natural plant communities. Since these communities form the basic life-support system for all species of plants and animals within them, their conservation can lead to the maintenance of biological diversity at all four levels discussed above. This is particularly true when preserved areas are large enough to include several natural plant communities.

Although a system of carefully selected natural areas, as proposed in this plan, will not by itself lead to the complete conservation of biological diversity throughout the West, it is an important first step. In addition to preserving representative stands of plant communities (and the biological diversity contained within) on BLM lands in the West, these natural areas (usually called Research Natural Areas) will be the focus of research that will greatly facilitate the conservation of biological diversity on other BLM lands, as well as on lands of other ownerships. Other uses of these natural areas will be authorized only to the extent they are compatible with the primary purpose of conserving the plant communities in as close to a natural state as possible.

Ideally, the system of natural areas discussed above should be developed irrespective of land ownership. The overriding concern should not be on the *ease* of conserving natural plant communities but on the *need* to conserve them. Accomplishing this requires coordination and commitment from all appropriate public and private agencies and organizations. Current efforts in California offer an example of how this can be done. A Memorandum of Understanding to conserve biological diversity was signed in 1991 by the major Federal and State agencies. To effectively conserve California's biological resources and maintain the State's social and economic viability, public agencies and private groups coordinate resource management and environmental protection activities, emphasizing regional solutions to regional issues and needs. Coordinated Resource Management Plans prescribe actions necessary to conserve the full range of biological diversity within each planning area, including rare plants and natural plant communities.

Eureka Dunes



The Eureka Dunes in California's Mojave Desert are home to two Federally listed endangered plant species, Eureka Valley dune grass (*Swallenia alexandrae*) and Eureka Dunes evening-primrose (*Oenothera avita* ssp. *eurekensis*). These spectacular desert dunes (one of the tallest inland dune systems in the world) are the only place in the world the two plants occur.

Eureka Valley dune grass is particularly noteworthy for the fact that it is a monotypic genus (i.e., a genus containing only one existing species), probably of great antiquity. So different is it from other grasses living today, its true relationship to other grass genera is a matter of conjecture.

Because of the extreme rarity of the plants and the fact that the dunes were frequented by off-road vehicles, the U.S. Fish and Wildlife Service listed the two species as endangered in 1978. They were among the first plants ever listed under the 1973 Endangered Species Act and were in fact the first BLM plants to be listed.

The BLM officially closed the dunes to off-road vehicles soon after the plants were listed but, because of a lack of law enforcement authority at the time, it was unable to adequately protect the two plants.

Designation of the Eureka Dunes as an Area of Critical Environmental Concern in early 1981 and the addition of BLM desert rangers paved the way for increased protection and management of the area. A management plan has been written for the area, educational brochures have been distributed to the public, and signs have been erected informing the public of the uniqueness of the Eureka Dunes and its closure to off-road vehicles.

The State of California, using money provided by the U.S. Fish and Wildlife Service, funded a study of the ecology of the two dune species, and the BLM annually monitors the two plants and their habitat. Although the species will always be rare, their continued prosperity at the Eureka Dunes appears to be ensured.

Eureka Dunes evening-primrose (*Oenothera avita* ssp. *eurekensis*)
by Mary Ann Showers

Background and Current Management

Roger Rosentreter

The more than 270 million acres of public lands managed by the BLM in the 13 western states[3] are the subject of this document. This represents more than 22 percent of the total land base and 39 percent of all Federal lands in these states. Clearly, the special status plants and natural plant communities found on these BLM lands contribute greatly to the biological diversity of the West.

Excluded from the scope of this document are the public lands and mineral estate managed by the BLM's Eastern States Office. The Eastern States Office manages 34 million acres of Federal mineral ownership and a small amount of surface BLM acreage in 31 eastern states. Within this large area, 91 plant species have been listed as endangered or threatened, and many more plants are candidates for Federal listing. Many of the BLM's actions within the jurisdictional boundaries of the Eastern States Office may affect these special status plants, and in many instances the other surface managing agencies rely on the BLM to identify special status plants and mitigate impacts to them. Thus, the special status plant program of the Eastern States Office is vitally important to conserving the special status plants within the 31 eastern states.

Because the Eastern States Office manages so little Federal surface lands compared to BLM offices in the 13 western states, the management emphasis differs substantially between the two regions. Because of this it was determined that a separate strategy should be developed for the Eastern States Office's special status plant and natural plant community programs.

[3]The 13 western states are Alaska, Arizona, California, Colorado, Idaho, Montana, New Mexico, Nevada, Oregon, South Dakota, Utah, Washington, and Wyoming. BLM lands in South Dakota and Washington are managed by the Montana and Oregon State Offices, respectively. Figures and tables in this document, therefore, include South Dakota and Washington under the entries for Montana and Oregon.

Special Status Plants

There are more than 1,100 special status plants known or suspected to occur on BLM lands (Figure 1). Over 60 percent of all listed threatened and endangered plants in the western United States are located on BLM lands. As natural habitats on private lands are destroyed by urbanization, agricultural uses, and other human activities, BLM lands become increasingly valuable. Some of these special status plant species occur only on BLM lands. Others occur predominantly on private lands, with a limited number of sites on BLM lands. For most of the latter plants, the Endangered Species Act protects only those plant populations on BLM lands (or on other Federal lands), making the BLM populations all the more critical to the survival of these species.

The BLM's policy and management can greatly affect the conservation of special status plants. It is the BLM's responsibility to take the necessary management actions to ensure the conservation of these species.

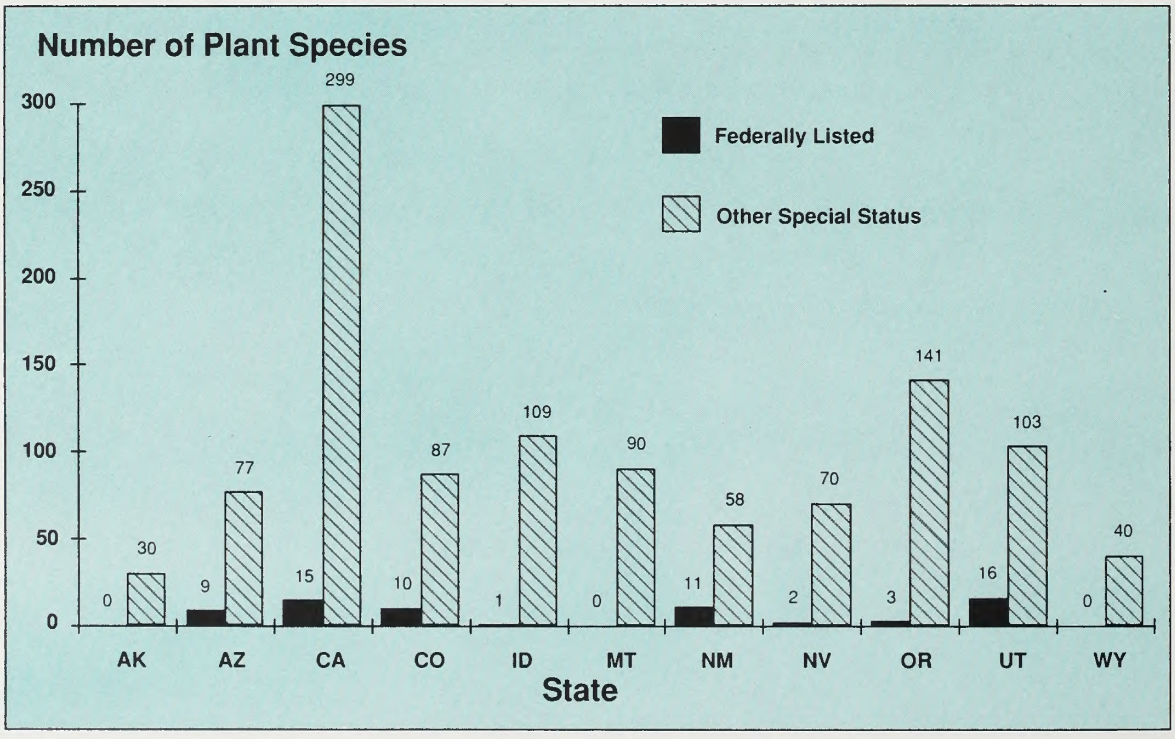


Figure 1. BLM special status plants by BLM State Office as of 1990. (Entries under Oregon and Montana include plants on BLM lands in the states of Washington and South Dakota, respectively.)

Natural Plant Communities

The BLM has designated or proposed for designation about 750 natural plant communities as special areas (Figure 2). Following designation, natural plant communities are managed as Areas of Critical Environmental Concern (ACECs), Research Natural Areas (RNAs), Outstanding Natural Areas (ONAs), and Special Management Areas (SMAs). The ACECs are designated under the authority of the Federal Land Policy and Management Act of 1976 to protect natural resources, systems, or processes that have more than local significance or have qualities or circumstances that make them rare, irreplaceable, exemplary, or vulnerable to adverse change. The RNAs, ONAs, and SMAs all protect natural features as do ACECs but differ in their management emphasis. The RNAs have natural features that are protected and managed for the purpose of research and education. They are particularly important in providing the baseline information needed for BLM monitoring of intensively managed areas. The ONAs protect and manage natural features for the purpose of recreation. The SMAs may or may not meet ACEC criteria but do have values that warrant special management or focus.

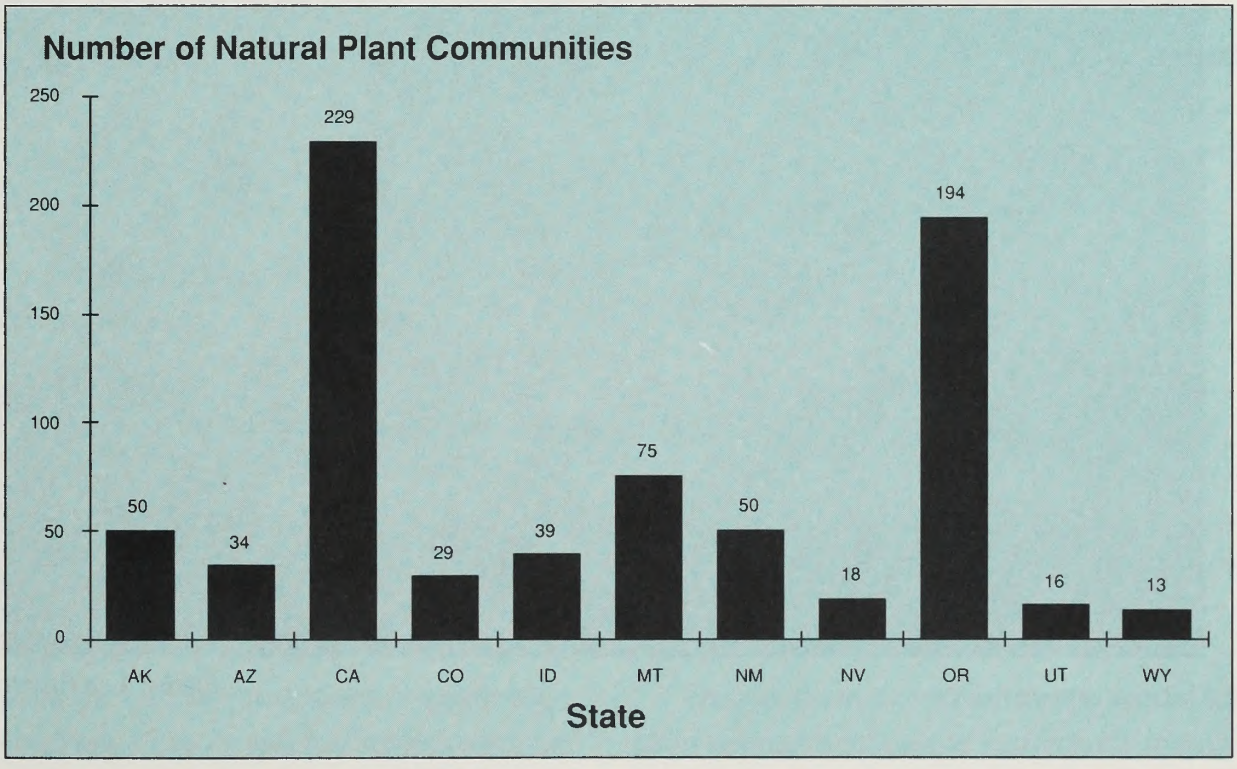
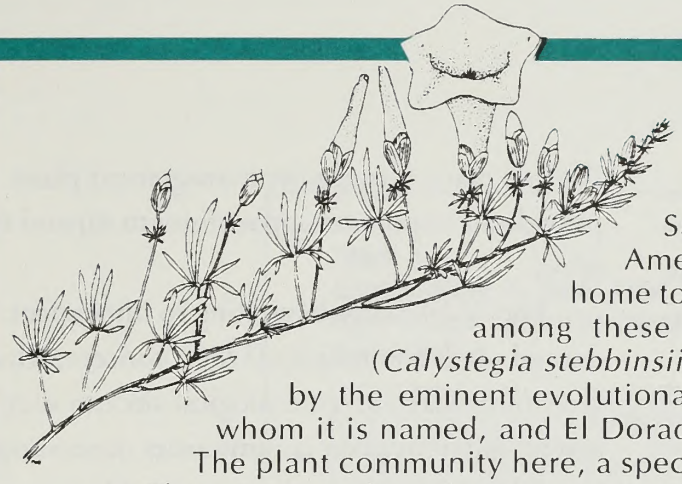


Figure 2. Number of natural plant communities designated as special areas as of 1990 or expected to be considered for designation by the year 2000.

Natural plant communities found on BLM lands are important for many of the same reasons that special status plants are important. Urbanization, agriculture, and other human activities have greatly altered many of the natural plant communities on private lands of the West. Public lands are therefore critical to maintaining the diversity of natural plant communities and biological diversity in general.

The BLM and the Forest Service manage the majority of public lands in the West. Actions taken by these two agencies to conserve natural plant communities are thus extremely significant. Because natural plant communities managed by them are generally different, both agencies must have strong pro-active programs to conserve and enhance these resources. The BLM's lands are absolutely essential to the conservation of most of the West's woodland, shrubland and grassland natural plant communities. They are also important for conserving riparian, wetland, and certain forest natural plant communities.

Daniel Lee Brown



Salmon Falls Area

On the outskirts of metropolitan Sacramento, along the South Fork of the American River, lies the Salmon Falls area, home to seven species of rare plants. Included among these plants are Stebbins' morning-glory (*Calystegia stebbinsii*), a species rather recently discovered by the eminent evolutionary botanist, G. Ledyard Stebbins, for whom it is named, and El Dorado mule ears (*Wyethia reticulata*).

The plant community here, a special type of chaparral, is also extremely rare. The area owes its uniqueness to a special soil, known as the Rescue Series, derived from gabbro rock. The series is limited to this area.

Only a few hundred acres of the Salmon Falls area are BLM lands; the remainder is in private ownership. Owing to its proximity to Sacramento, urbanization threatens to eliminate much of this unique habitat. Houses have already been built on several areas within this "ecological island."

The pressure from urbanization makes the rather small acreage of BLM lands all that more important to the conservation of the rare plant species and special habitat of the area. The BLM and the California Department of Fish and Game are exploring ways to acquire additional lands in the area through land exchanges and purchases to ensure that at least one representative stand of this unique ecosystem is preserved in perpetuity. The Center for Plant Conservation is also assisting in this effort.

Stebbins' morning-glory (*Calystegia stebbinsii*)
by Mary Ann Showers

Current Management

Several laws, regulations, and policies govern the management of special status plants and natural plant communities on public lands. These are discussed in Appendix A.

The management of special status plants is a growing program for the BLM. Within the past three years the staff assigned to the program has increased from 15 to 24 and further increases are expected. The overall completion of field projects by this group is relatively minor compared to other BLM programs, but significant progress is being made toward proper management. For example, 16 percent of needed inventory has been completed. Likewise, 18 percent of the activity plans and 10 percent of the research and studies proposed by BLM personnel have been completed.

Despite these accomplishments, special status plant management can be significantly improved. Perhaps most in need of additional effort is the BLM's rare plant monitoring activities. Thirteen percent of the BLM's special status plants are

currently being monitored. To ensure plants do not become endangered, or even extinct, monitoring must be initiated on all rare plant species. The effectiveness of the BLM's management efforts in conserving these plants can only be evaluated through monitoring. The BLM's Coordinated Interdisciplinary Resource Monitoring Strategy offers good promise as a way to make plant monitoring more efficient and useful.

Management of natural plant communities has varied between states. As with special status plants, however, significant accomplishments have been made. The BLM has designated or identified for designation about 750 natural plant communities as special areas. State Offices report that 34 percent of their inventory needs, 26 percent of their activity plans, and 20 percent of their proposed research and studies have been completed for natural plant communities. Thirty-two percent of all designated natural plant communities are being monitored. Most states report inadequate program coordination and activity plan implementation, mainly because of insufficient funds and personnel. The personnel assigned responsibility for natural plant community management usually have other primary duties and can't spend the time necessary for a uniform ecosystem approach to management. The BLM needs the capability to record and track program needs and accomplishments.

An important concept that BLM is beginning to apply involves developing and implementing plans for entire plant communities as opposed to single species plans. The goal is to conserve several rare plants (and perhaps several animals as well) through the implementation of a single plan. Natural plant community management plans provide an important opportunity to expand this effort.

The BLM is also beginning to implement the desired plant community (DPC) concept, which recognizes that a given ecological site can support several different plant communities depending on natural processes and management. Management plans are developed that describe the DPC and prescribe actions necessary to achieve and maintain it. Application of the concept to natural plant communities can greatly assist both in clearly characterizing these communities and determining the actions necessary to effectively restore and maintain natural plant communities. This approach calls for BLM personnel such as range conservationists and foresters to work together for long-term plant community stability.

Fiscal Year 1989 expenditures for both the rare plant and natural plant community programs are presented in Table 1. Expenditures have generally increased from 1980 to 1989. Alaska reported no expenditures in either program and Montana reported no expenditures in the special status plant program. This is expected to change because both of these states have recently hired personnel for these programs. California and Oregon spent more than twice that of all other states combined. Expenditures in the special status plant program throughout the BLM have been primarily for project clearances (office and field reviews to ensure that a project proposed or authorized by the BLM does not adversely affect any special status plants).

Current management status is also reflected in the several figures and tables presented in the

Table 1.
Expenditures in fiscal year 1989 for management of special status plants and natural plant communities.

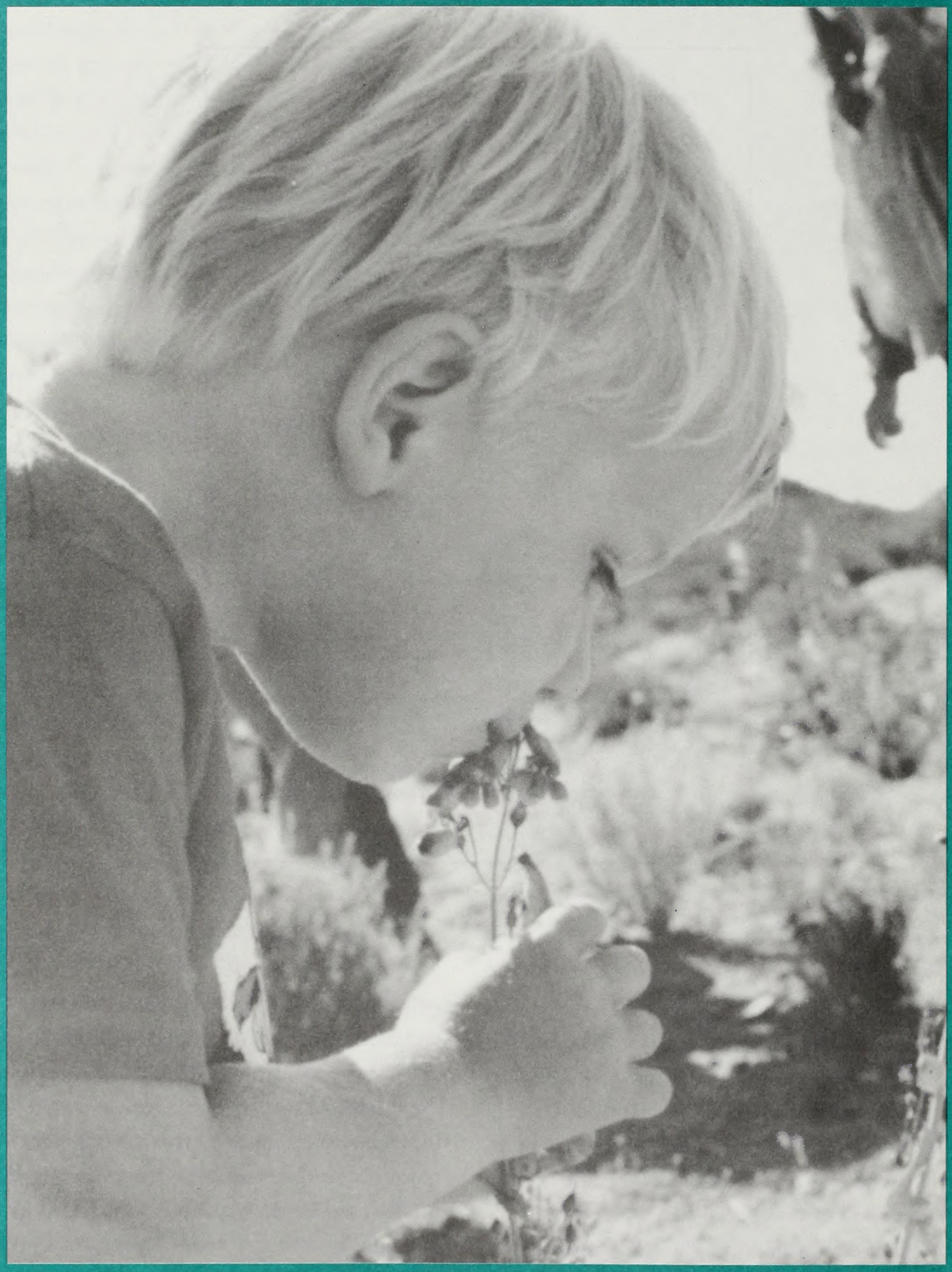
State	Expenditures [1] Special Status Plants	Natural Plant Communities
AK	$ 0	$ 0
AZ	60,000	15,000
CA	158,000	52,000
CO	83,000	56,000
ID	38,000	5,000
MT	0	4,000
NM	32,000	32,000
NV	37,000	6,000
OR	350,000	62,000
UT	80,000	10,000
WY	10,000	10,000
Total	848,000	252,000

[1] Values are estimates; budget tracking system does not isolate expenditures for special status plants or natural plant communities.

remainder of this document. All data given in these figures and tables were obtained from BLM field offices and outline the situation as of 1990.

This strategy elaborates and expands on the *Fish and Wildlife 2000* goals and objectives. Three of the goals of *Fish and Wildlife 2000* guide the future direction of the special status plant and natural plant community programs. Two of these goals direct the BLM to recover listed plant species and prevent other species (candidate and sensitive species) from reaching the listing point. The third goal focuses on the conservation of rare, vulnerable, and representative natural plant communities. The complete text of these goals and their associated objectives is included in Appendix B.

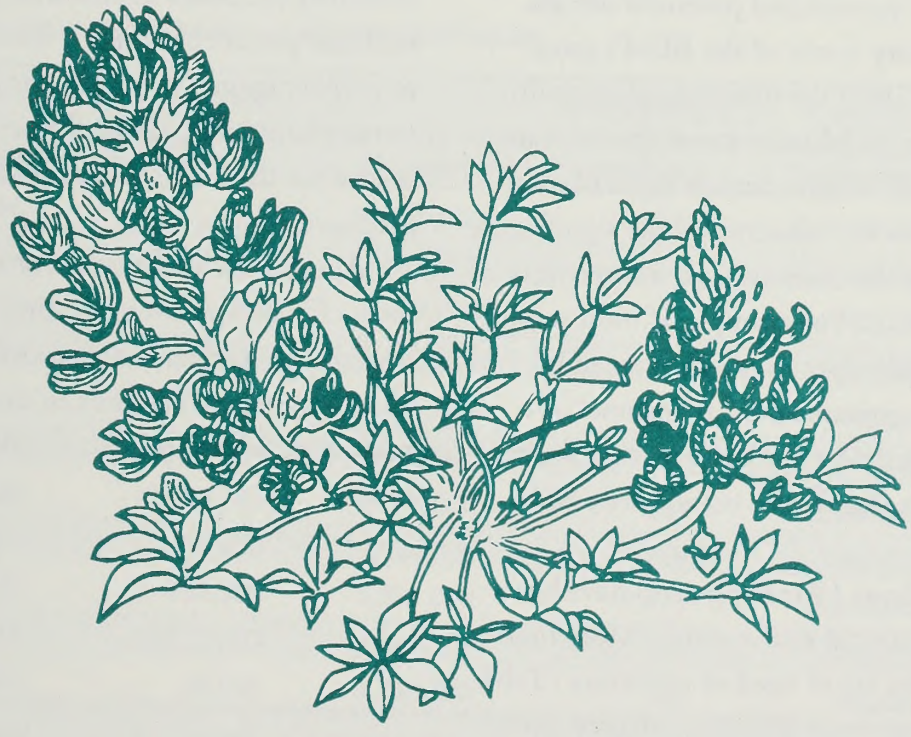
Management Strategies for the Future



John Willoughby

This chapter outlines opportunities and strategies for managing the BLM's special status plants and natural plant communities between now and the year 2000. Estimates of costs and identified accomplishments were provided by BLM field offices. Separate sections are provided on personnel opportunities and program awareness applicable to both programs. A schedule for implementing these strategies is given in Appendix C.

The proposed accomplishments and dollar estimates are based on the best information available at the time this document was prepared. True costs may increase as additional species are discovered on the public lands. It is also possible, however, that costs will decrease if additional inventory demonstrates that some species are more abundant than anticipated and, therefore, not in need of special management. All dollar estimates are expressed in terms of 1991 dollars.



Mono Lake lupine (*Lupinus duranii*)
by Joy Fatooh

Special Status Plants

GOAL 1. Inventory: Ensure that adequate baseline data are available on the distribution and condition of special status plants.

Management Opportunities

To implement laws, regulations, and policies it is necessary to have adequate baseline information to make informed decisions. Baseline information is gathered through inventory.

The types of baseline information important to decision-making include: 1) number and location of occupied sites; 2) quality or significance of sites; 3) number of plants at each site; 4) types of habitat required; 5) sensitivity of habitat to the effects of different resource activities and uses; and 6) current and potential threats.

Basic inventory is one of the BLM's most pressing needs. Given the demands of its multiple use mandate, the BLM must know the habitats that need protection from certain types of management activities and understand the significance of BLM lands to the conservation and recovery of special status plants. For example, if most populations of a particular species are threatened by development on private lands, it becomes extremely important that the BLM protect the few populations that might exist on adjacent BLM lands.

Currently about 19 million acres have been inventoried for special status plants. More than 100 million acres are in need of inventory (Table 2). In addition to those with documented occurrences on BLM lands, more than 600 rare plants are believed to occur on BLM lands, but their presence remains unconfirmed.

Much of the inventory work that has been completed to date has been to determine whether particular special status plants are present in an area to be impacted by a project. Although this type of inventory can yield valuable information, much of the information is negative in character: it tells the manager where a particular plant *does not* occur. More important to active management, however, is where and under what circumstances the plant species *does* occur. The more pro-active inventory proposed in this strategy will not only facilitate project clearances, it will allow a manager to prepare species management plans for all special status plants and provide for better decisions if a special status plant is found within the area of a proposed project.

Automated information systems present the most efficient means of making this information available to staff and management. Development of such systems will result in more effective conservation of special status plants on BLM lands.

Recommended Strategies

1. Develop an inventory system for special status plants that includes different intensities and levels of detail. Issue guidance on the situations for which each class of inventory is appropriate.
2. Determine the distribution and condition of special status plants through the inventories identified in Table 2.
3. Develop and implement automated data bases for the storage and retrieval of information on special status plants. Ensure these data bases are integrated with the BLM's Land Information System, including the component Geographic Information System (GIS).

Table 2.
Special status plants: Inventory situation and needs.

State	Acres Inventoried to Date	Acres in Need of Inventory	Workmonths Needed to Inventory	Funding Needed to Inventory
AK	0	50,000,000	120	$ 4,400,000
AZ	1,776,000	614,000	240	425,000
CA	684,000	6,027,000	1,509	4,500,000
CO	612,000	650,000	74	635,000
ID	4,350,000	6,524,000	115	345,000
MT	42,000	6,778,000	350	1,615,000
NM	3,609,000	4,905,000	381	2,218,000
NV	1,046,000	10,668,000	258	646,000
OR	763,000	3,831,000	2,475	7,285,000
UT	6,317,000	7,925,000	66	292,000
WY	18,000	2,760,000	48	198,000
Total	19,217,000	100,682,000	5,636	22,559,000

Recovery and Delisting of Sneed's Pincushion Cactus in New Mexico

Sneed's pincushion cactus (*Coryphantha sneedii* var. *sneedii*), a miniature species found in New Mexico and Texas, has been listed as endangered since 1979. At the time of its listing, the only population known to exist was in the Franklin Mountains. That population was threatened by proposed highway construction, collection, and potential mining operations.

In the early years after listing, New Mexico botanists had discovered populations of Sneed's pincushion scattered throughout the isolated mountain ranges across the southern portion of the state, mostly on BLM lands. The plant is often found on Middle Silurian dolomite formations, and potential habitat was easy to determine with the aid of geologic maps.

The New Mexico Plant Recovery Team discussed the status of Sneed's pincushion early in 1989 at its annual meeting and decided that there was sufficient evidence to indicate more widespread distribution and security of habitat than was known at the time of listing. Botanists from the State of New Mexico and the Fish and Wildlife Service agreed to organize and lead systematic searches for the next several years to document the species' distribution and status in preparation for a recommendation for delisting.

The BLM has contributed to securing the species by proposing habitat in the Franklin and Organ Mountains as Areas of Critical Environmental Concern and by completing a Habitat Management Plan (HMP) for the species. BLM personnel also braved early season heat, steep terrain, and impalement on the sharp-thorned desert shrub vegetation of southern New Mexico to participate in surveys conducted during the three to four week period in April when the cactus blooms and is most easily identified. The first year of effort revealed there are potentially many more locations on which Sneed's pincushion probably occurs, and several more seasons of hard work are required to obtain the thorough documentation necessary to support a delisting package.

The BLM has an important role to play in the effort to delist Sneed's pincushion. As the primary manager of the plant's habitat, the BLM must ensure the long-term security of populations under its management in order to maintain its recovery. Management actions implemented in the HMP include periodic monitoring studies, patrols at popular collecting locations by BLM rangers, continued habitat inventory, acquisition of private and state-owned habitat, notification of miners conducting operations in its habitat, completion of mineral withdrawals, off-road vehicle closures, and fire suppression prescriptions. These actions exemplify the BLM's commitment to the recovery of Sneed's pincushion and represent a significant management responsibility now and in the future.

GOAL 2. Planning: Include provisions for special status plant management and conservation in all BLM funded or authorized actions.

Management Opportunities

The BLM can fulfill its responsibilities under the Endangered Species Act by using its land use and activity planning processes and its National Environmental Policy Act (NEPA) compliance procedures (environmental assessments and environmental impact statements). Integration of special status plant needs and recovery objectives into each aspect of the BLM's project planning will contribute directly to potential recovery and delisting.

The opportunities for conflict resolution are greatest at the Resource Management Plan (RMP) stage. The RMP should make appropriate land use decisions that promote the conservation of special status plant species and their habitats. This includes identifying opportunities for habitat acquisition and retention as well as imparting special management designations, such as Areas of Critical Environmental Concern, on special status plant habitat.

To date, approximately 105,000 acres have been identified for acquisition to enhance the recovery of 92 special status plant species (Table 3). Much of the acquisition can be accom-

Table 3.
Special status plants: Habitat acquisition needs.

State	Number of Plants for which Acquisition Needed	Number of Acres to Acquire [1]
AK	UNK [2]	UNK [2]
AZ	9	21,828
CA	9	6,550
CO	15	30,355
ID	3	1,210
MT	4	5,250
NM	5	2,795
NV	8	870
OR	39	36,512
UT	0	0
WY	0	0
Total	92	105,370

[1] It is anticipated that most of this acquisition can be accomplished through land exchanges. Therefore, no costs associated with this effort are identified in this document.
[2] Unknown because of lack of inventory data.

plished through land exchanges. Acquisition efforts will comply with the Director's "no net gain" policy, whereby the total area of BLM lands will not increase.

Activity planning provides the opportunity to design and schedule site-specific management prescriptions and projects to benefit individual species, habitats, and communities. (Activity plans are site-specific plans developed for all activities, and include habitat management plans, allotment management plans, recreation area management plans, and others.) As of the end of 1989, 110 activity plans had been completed for special status plants (Table 4). An additional 498 are required to adequately initiate management for known species. In addition, habitat improvement

Table 4.
Special status plants: Activity planning progress and needs.

State	Activity Plans Completed	Activity Plans to be Developed	Workmonths Needed to Develop Plans	Funding Needed to Develop Plans
AK	0	UNK [1]	UNK [1]	UNK [1]
AZ	9	27	50	$ 148,000
CA	35	95	206	620,000
CO	28	42	159	583,000
ID	5	49	74	240,000
MT	0	45	181	855,000
NM	9	23	125	424,000
NV	0	42	121	308,000
OR	19	156	217	511,000
UT	5	15	19	56,000
WY	0	4	34	136,000
Total	110	498	1,186	3,881,000

[1] Unknown because of lack of inventory data.

Table 5.
Special status plants: Habitat improvement project needs.

State	Number of Plants for which Projects are Proposed	Percent of Total Number of Special Status Plants	Workmonths Needed for Projects	Funding Needed for Projects
AK	0	UNK [1]	UNK [1]	UNK [1]
AZ	8	9%	24	$ 72,000
CA	40	11%	150	620,000
CO	28	29%	109	450,000
ID	42	38%	116	418,000
MT	43	68%	173	787,000
NM	10	15%	30	135,000
NV	2	3%	5	15,000
OR	59	12%	111	339,000
UT	10	8%	25	251,000
WY	2	6%	23	192,000
Total	244	16% (Average)	766	3,279,000

[1] Unknown because of lack of inventory data.

projects costing nearly $3.3 million have been identified for 244 plant species to help recovery or enhance biological diversity (Table 5).

The NEPA compliance procedures provide opportunities for the BLM to learn more about the status and distribution of special status plants and afford a mechanism to implement protective measures to further recovery objectives. The NEPA compliance alone does not constitute a strong inventory program, but the fieldwork entailed can be extremely valuable nevertheless. Botanists and other qualified personnel are providing the information needed to ensure proper protection of rare plants on many projects, but many of the BLM's environmental assessments do not adequately address special status plants.

Recommended Strategies

1. Update the BLM's Supplemental Program Guidance to provide stronger guidance for land use planning related to special status plants. Specifically consider including the following requirements:
   a. Identification of opportunities for acquisition and retention of lands that are essential to species' recovery.
   b. Incorporation of pertinent recovery plan objectives into RMPs.
   c. Evaluation of the significance of BLM lands to the conservation of special status plants and their habitats within a planning area.
   d. Inventory of special status plants and their habitats within the planning area (using the inventory system recommended under Goal 1).
2. Develop and implement the activity plans identified in Table 4.
3. Implement the projects identified in Table 5.
4. Develop land adjustment plans by state to identify the highest priority lands to acquire.
5. Acquire lands identified in Table 3.
6. Develop guidance to ensure that NEPA compliance considers seasonality and other unique requirements necessary to properly evaluate impacts to special status plants and their habitats.

Reclamation with Aase's Onion

The Unimin Mining Corporation and the Idaho State Office of the BLM entered into a cooperative agreement to study the reestablishment of Aase's onion (*Allium aasae*) on sites that have been disturbed by mining. Unimin operates mining claims for silica sand on Federal lands. These operations are destroying a small population of the onion, a narrowly endemic species that is a Federal candidate for listing as endangered or threatened.

Locally, the onion is abundant on sandy soils. There are approximately 200 known sites for this species. About 20 percent of its range is on BLM lands, two percent is on Forest Service lands, and the remaining 78 percent is on private lands. Because there are no Federal or state laws or policies protecting the plant on private lands, the sites on BLM and Forest Service lands are critical to ensuring the species' continued existence. Although the species currently does not require full protection, it is restricted enough that special management is warranted.

Unimin has funded a botany position for six to eight months a year for four years, which is supervised by the Idaho BLM State Office botanist. The first year was spent in the laboratory studying the germination requirements of the plant. This study found that the species' seeds require at least two months in a cold, wet environment before they will break dormancy and germinate.

In succeeding years, seeds and bulbs were experimentally planted under various conditions. Based on the experimental plot results we now know the soil texture, slope, and other conditions required for restoration. Once Unimin's mining claim is ready for reclamation, the proper slope and seedbed will be provided, and seeds of Aase's onion will be planted.

Aase's onion (*Allium aasae*) by Jeanne R. Janish (University of Washington Press).

Bradshaw's Lomatium and the Long Tom ACEC

Along the banks of the Long Tom River in Oregon's Eugene District is a wet prairie that forms small ponds and pools on clay soils during the winter months. Botanists say that it is part of the remaining one percent of the Willamette Valley that looks much as it did over a century ago. The Eugene District has designated the site an Area of Critical Environmental Concern (ACEC) to preserve its natural character and to protect Bradshaw's lomatium (*Lomatium bradshawii*), a Federal endangered species.

In October 1988, the Long Tom ACEC was burned to rid the area of invading shrubs and weeds. About the same time, the ACEC was fenced to protect the endangered lomatium and promote recovery of the native vegetation. The fence was completed just as cattle were released on adjacent private land.

Monitoring transects have been established to determine the effectiveness of the District's efforts. Studies at other locations suggest there will be a positive response by the rare plant.

Botanists had been expressing concern over Bradshaw's lomatium for over 10 years. "It's exciting," as former District botanist Peter Zika put it, "that we are doing something about it."

GOAL 3. Monitoring and Research: Ensure sufficient data are available to evaluate management actions, to provide a basis for making informed decisions about management and conservation actions, and to assess progress towards recovery.

Management Opportunities

Comprehensive monitoring and research programs are necessary to evaluate management activities affecting plants and to demonstrate BLM compliance with the Endangered Species Act. Monitoring and research are essential to the actions described in Goal 2, providing information for long-term decision-making, including determining whether: a) the BLM is achieving the conservation and recovery objectives established in recovery, land use, and activity plans; b) certain projects or management prescriptions are having the desired effect; c) mitigation measures implemented as part of NEPA compliance are effective; and d) the BLM should change its management. Monitoring and research enable the BLM to base its recovery work on sound ecological knowledge of special status plants and their habitat.

Monitoring efforts should be expanded to include the 87 percent of special status plants not currently being monitored. An estimated $6.5 million is required for adequate monitoring of special status plants (Table 6). Research and studies are also needed so that managers can determine the best management for special status plants. Sixty-one out of 593 necessary studies have been completed (Table 7).

Table 6.
Special status plants: Monitoring progress and needs.

State	Percent of Special Status Plants Currently Being Monitored	Workmonths Needed for Adequate Monitoring	Funding Needed for Adequate Monitoring
AK	0%	UNK [1]	UNK [1]
AZ	17%	301	$1,124,000
CA	6%	500	1,500,000
CO	47%	87	334,000
ID	30%	172	566,000
MT	5%	106	318,000
NM	9%	264	792,000
NV	29%	174	461,000
OR	8%	394	953,000
UT	5%	48	184,000
WY	3%	50	218,000
Total	13% (Average)	2,096	6,450,000

[1] Unknown because of lack of inventory data.

Table 7.
Special status plants: Research and study progress and needs.

State	Studies Completed	Studies Needed	Workmonths Needed to Conduct Studies	Funding Needed to Conduct Studies
AK	0	UNK [1]	UNK [1]	UNK [1]
AZ	2	26	56	$ 453,000
CA	4	65	70	720,000
CO	0	4	11	71,000
ID	8	104	292	1,234,000
MT	2	50	100	800,000
NM	22	70	133	540,000
NV	5	56	150	379,000
OR	15	132	314	693,000
UT	3	23	67	220,000
WY	0	2	50	256,000
Total	61	532	1,243	5,366,000

[1] Unknown because of lack of inventory data.

Recommended Strategies

1. Develop monitoring standards to ensure a requisite minimum level of information is available.
2. Develop a BLM technical reference on plant population and community monitoring techniques.
3. Develop policy and guidance to ensure that site-specific monitoring objectives are included in activity plans that address management of special status plants and their habitats.
4. Develop Resource Area monitoring plans for special status plants and their habitats that schedule measurement and periodic evaluation of trend, status, and progress toward meeting recovery and conservation objectives.
5. Ensure that the BLM's Land Information System provides for entry of data into a standard data base and has the capability to store, retrieve, and analyze monitoring data.
6. Implement a standardized Bureauwide system to track recovery objectives and actions in recovery and activity plans.
7. Conduct the monitoring identified in Table 6.
8. Conduct the research and studies identified in Table 7.

Navajo Plains Cactus - A Study in Monitoring Tenacity

Navajo plains cactus (*Pediocactus peeblesianus* var. *peeblesianus*) is a Federally listed endangered species. It occupies a 1 x 7 mile corridor near Joseph City in northeastern Arizona. Within this corridor only about 1,000 plants have been found. To say that this species is cryptic may be understating the situation: its short, round spines and diminutive stature give it a remarkable resemblance to the short grass with which it is usually associated, and it can be spotted only with difficulty by even the most seasoned botanists, except when its yellow flowers distinguish it from its grassy habitat. The BLM Phoenix District has been monitoring Navajo plains cactus populations for a long time. District personnel's experience with this cryptic species has led them to modify their monitoring techniques over time. This has resulted in a very intensive monitoring method, involving subdividing the larger plot into two meter wide strips and searching each strip on hands and knees. In fact, kneepads are an essential part of the monitoring uniform! They have found that four people searching the same plot in an upright position and without subdividing the plot located fewer plants than two people crawling through the subdivided plot.

The Phoenix District has learned a lot about the sometimes unique demands of rare plant monitoring from its experience with Navajo plains cactus.

GOAL 4. Coordination: Ensure that management for special status plants is carried out efficiently and consistently across jurisdictional and political boundaries.

Management Opportunities:

Much of the information on plants being collected by various agencies and private groups is not comparable. This makes it very difficult to assess how well a plant species is being managed. It also leads to duplication of effort. For example, one agency may gather inventory information that has already been collected by another. This lack of coordination also makes it hard to determine the management needs of species crossing jurisdictional boundaries and results in unneeded expenditures.

It is imperative that the BLM expand cooperation with other agencies and private groups involved with the management of private lands. Most land management agencies and private groups have common goals and objectives for the conservation of special status plants. In many cases it would be more cost effective and efficient to enter into management agreements for certain areas and to share training facilities, classes, and costs of management for the conservation of this resource.

Challenge Cost Share funding affords the BLM another opportunity to improve coordination, reduce BLM costs, and expand partnerships in the management of the public lands and their resources.

Recommended Strategies:

1. Develop standard interagency and intergroup data storage, management, and exchange procedures. Cooperate with the Forest Service, the Soil Conservation Service, the National Park Service, the Fish and Wildlife Service, the Environmental Protection Agency, and The Nature Conservancy to develop consensus on BLM Automated Resource Data standards. Adapt and expand existing systems where possible and appropriate.
2. Organize and participate in state, regional, and national workshops that are attended by personnel from other agencies and organizations involved with special status plant management.
3. Develop interagency training courses in inventory, monitoring, and statistical analysis and interpretation, with improved opportunities for field level participation.
4. Develop an action plan in each state to ensure cooperation between all agencies and groups involved in special status plant management.
5. Develop procedures for interagency and intergroup participation in cooperative studies and research of genetic uniqueness, reintroduction, habitat requirements, habitat restoration, population biology, and other pertinent subjects.

Dwarf Bear-Claw Poppy

Management of the endangered dwarf bear-claw poppy (*Arctomecon humilis,* pictured on cover) has been a challenge for the BLM. The poppy is a perennial herb, narrowly endemic to gypsum soils near St. George, Utah. Off-road vehicle traffic and mineral assessment work on existing gypsum claims immediately threatened the habitat. A potential threat includes expected development of the St. George metropolitan area.

In 1986, the BLM was approached by Brigham Young University (BYU) officials, who offered assistance in studying the poppy. The principal investigator was Deanna Nelson. She received assistance from Dr. Kimball Harper, a renowned plant ecologist. The purpose of the study was to carefully examine the general ecology and habitat requirements of the poppy. In 1987, the BLM provided money for the study through the Native Plant Society. In 1988, 1989, and 1990, the BLM provided money directly to the study through the Challenge Cost Share program. Travel and housing were also provided.

In August 1989, Nelson released manuscripts of two journal articles that describe the information obtained over the previous three years. These articles are the basis for her master's thesis at BYU. The articles contain important ecological information that otherwise would not be available to the BLM due to constraints of budget, time, and expertise. As a result of the information received from these studies, the BLM is re-evaluating management strategies for protection and recovery of the dwarf bear-claw poppy.

University personnel have noted that because of the BLM's financial involvement with the investigation and the presence of BLM personnel on the ground with the investigators, the role that the BLM plays in the management of special status species is better understood. A cooperative working relationship has been established between the BLM and BYU, and additional projects are being planned for the future.

Natural Plant Communities

Natural plant communities are plant communities that have not been substantially altered by human activity or that are managed to minimize human-caused disturbance. The natural plant communities that are the focus of this program include both those that are rare and those that are representative of more common communities. They correspond to the "special habitats" discussed in *Fish and Wildlife 2000.*

Natural plant communities worthy of special management are designated as special areas, which include Areas of Critical Environmental Concern, Research Natural Areas, Outstanding Natural Areas, and Special Management Areas. Currently designated special areas, including those designated for reasons other than plant resources (e.g., wildlife and cultural special areas), contain many natural plant communities. One of the strategies proposed below is to determine which natural plant communities are represented within already established special areas, whether these communities are in satisfactory condition, and whether current management plans are adequate to ensure the conservation of these communities.

GOAL 1. Policy: Develop policy and guidance for defining and managing natural plant communities.

Management Opportunities

Natural plant communities at present have no distinct identity in the BLM. These communities are valuable to a multitude of BLM programs, and there is a need to increase the emphasis on the designation and management of natural plant communities.

Recommended Strategies

1. Develop guidance in the BLM Manual 1700 series that defines natural plant communities, discusses their importance, identifies program objectives, and describes the responsibilities of each organizational level in carrying out the objectives.
2. Appoint natural plant coordinators at every organizational level, and make the management of natural plant communities a primary duty of each coordinator.

GOAL 2. Inventory and Monitoring: Identify natural plant communities on BLM lands and ensure adequate data are available to guide management and conservation activities and evaluate the effects of management actions.

Management Opportunities

Figure 2 shows the number of natural plant communities that have received or are expected to receive special area designations. To date, most of these plant communities have been designated based on the presence of special status plants and animals or rare plant communities. Perhaps because of the emphasis on individual species conservation mandated by the Endangered Species Act, conservation of the larger, more common plant communities and ecosystems has not been emphasized in BLM programs. A few BLM offices have established Research Natural Areas to preserve good representative stands of such widespread natural plant communities. The issue of maintaining biological diversity and dialogue within the scientific and conservation communities have elevated awareness of the importance of conserving functional ecosystems. About 6.3 million of the BLM's 270 million acres have been inventoried to date for natural plant communities.

Monitoring must be initiated to determine if the BLM is meeting objectives for biological diversity established in *Fish and Wildlife 2000* on national, regional, and local levels. Currently, 32 percent of designated natural plant communities are being monitored. As more natural plant communities are identified and designated, this monitoring workload will increase.

Recommended Strategies

1. Develop a system that enables the BLM to identify, describe, and evaluate natural plant communities on a regional and national basis.
2. Identify natural plant communities and determine their distribution and status on BLM lands through inventories identified in Table 8.
3. Evaluate existing special areas to determine which natural plant communities are contained therein, whether these communities are in satisfactory condition, and whether current management plans are adequate to ensure the conservation of these communities.
4. Establish objectives for conservation, restoration, and protection of natural plant communities through land use and activity planning.
5. Monitor objectives for natural plant communities and use the results to evaluate management actions and assist in making management decisions. Workmonths and dollars necessary for this effort are identified in Table 8.
6. Ensure that the BLM's Land Information System has the capability to store, retrieve, and analyze monitoring data and provides for entry of data into a standard data base. Use that capability to increase monitoring efficiency, facilitate data interpretation, and aid in decision-making.
7. Ensure that this initiative is integrated within a larger framework of vegetation management across BLM programs.

Table 8.
Recommended strategies for management of natural plant communities and the workmonths and costs necessary for implementation.

Strategy	Units Needed	Workmonths Needed	Funding Needed
Inventory	12,106,000 acres	1,098	$ 7,642,000
Monitoring	747 plant communities	924	2,878,000
Habitat Improvement	176 plant communities	491	2,637,000
Research and Studies	172 studies	597	2,616,000
Activity Planning	325 plans	627	1,864,000
Habitat Acquisition	93,000 acres	*	*
Total		3,737,000	17,637,000

* It is anticipated that most of this acquisition can be accomplished through land exchanges. Therefore, no costs associated with this effort are identified in this document.

GOAL 3. Planning: Develop and implement plans, in accordance with schedules resulting from management decisions, to maintain the characteristics of natural plant communities.

Management Opportunities

Management opportunities related to the planning system are similar to those presented for special status plants in the previous section. In many cases, natural plant communities will include one or several rare plants. The conservation of the entire functioning ecosystem will be more effective than single species oriented management in recovering such rare plant species.

Activity plans tie together objectives and monitoring discussed in Goal 2 with other actions such as research, habitat improvement projects, and land acquisition. The BLM has completed 112 activity plans for natural plant communities and identified the need to complete approximately 325 more. About $2.6 million is needed for research to better manage these habitats, along with another $2.6 million for habitat improvement projects. In addition, some 93,000 acres have been identified for potential acquisition to conserve natural plant communities.

Recommended Strategies

1. Update the BLM's Supplemental Program Guidance to include considerations for natural plant communities in land use planning. Include requirements for the following:
   a. Nominating, evaluating, and designating natural plant communities as ACECs, RNAs, ONAs, etc.
   b. Identifying opportunities for acquisition and retention of natural plant communities, and other opportunities for improved management of natural plant communities to provide for their conservation, restoration, and enhancement.
   c. Evaluating the significance of BLM lands in maintaining and conserving natural plant communities.
2. Develop and implement activity plans for natural plant communities that prescribe projects and management actions to conserve them. Activity plans, habitat improvement projects, workmonths and funding requirements are given in Table 8.
3. Undertake research to increase the BLM's understanding of natural plant communities and improve its managerial capabilities for these areas. Numbers of studies needed and the workmonths and dollars required to conduct the studies are given in Table 8.
4. Develop land adjustment plans by State to identify highest priority acquisitions.
5. Acquire lands identified in land adjustment plans as necessary for the conservation of natural plant communities (Table 8).

GOAL 4. Coordination: Collaborate on a continuing basis with the National Park Service, the Forest Service, the Fish and Wildlife Service, the states, and private groups to protect the best natural plant communities and to ensure consistent management across jurisdictional boundaries.

Management Opportunities

Collaboration among all concerned parties will more effectively address biological diversity issues such as habitat fragmentation. The BLM has no data on the number of special area designations that have resulted from systematic evaluation of plant communities and ecosystems across jurisdictional boundaries. It is safe to say, however, that most of the existing designations were developed under a primarily local focus. Systems to attain regional and national levels of resolution for identifying, evaluating, and managing natural plant communities are not yet well established among land management agencies. Developing these is a challenge for the future.

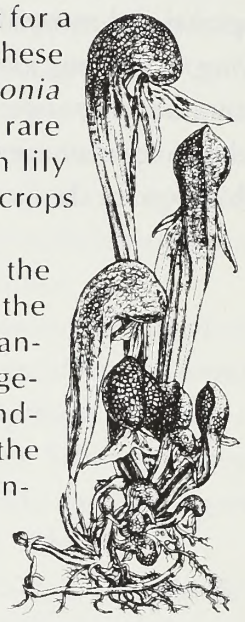
Recommended Strategies

1. Participate in interagency and intergroup cooperative studies and research on plant community classification, evaluation, function, management, and restoration.
2. Organize and participate in state, regional, and national interagency workshops that address identification and management of natural plant communities.
3. Develop, with other Federal, state, and private groups, a system to identify and manage natural plant communities across jurisdictional boundaries.

Eight Dollar Mountain

Eight Dollar Mountain is one of the most significant botanical areas in Oregon. It represents the major area of species endemism in the State. The mountain provides diversified habitats for 11 candidate plants under review by the U. S. Fish and Wildlife Service (FWS) for listing as threatened or endangered. This represents almost nine percent of the plant species under review by FWS in Oregon. These species occur primarily in the Illinois Valley area of southwestern Oregon. The mountain is the type locality for a variety of different species. For these reasons, the area is the subject of research projects by botanists from throughout the United States.

The mountain's topography gives it its unique character. It rises from 1,200 to over 4,000 feet in elevation and is relatively symmetrical, presenting the four major aspects (north, south, east and west) within a compact area. The diversified habitats on Eight Dollar Mountain are a combination of the mountain's unique geology, its conical shape, and an elevational range that combine to produce habitat for a wide variety of species in a small area. Most significant of these habitats are the large California pitcherplant (*Darlingtonia californica,* an insectivorous plant) bogs that contain many rare plant species, including the very rare large-flowered rush lily (*Hastingsia bracteosa*). Jeffrey pine savannah and rock outcrops also provide habitat for many of the rare species.



The Medford District has designated 1,240 acres of the mountain as an Area of Critical Environmental Concern for the botanical values found there. The multi-ownership is managed under an "Eight Dollar Mountain Coordinated Management Framework Plan" and a Memorandum of Understanding. The participants are the BLM, the U.S. Forest Service, the State of Oregon, Josephine County, the Eight Dollar Mountain Landowners' Association, and The Nature Conservancy. The intent is to provide for a cooperative management relationship that will maintain the integrity of the plant communities on the mountain.

California pitcherplant (*Darlingtonia californica*)
by Mary Barnas Pomeroy (University of California Press)

Personnel

GOAL 1. Adequate Staffing: Ensure there are adequate personnel with appropriate qualifications to carry out and monitor the special status plant and natural plant community programs.

Management Opportunities

An adequate number of qualified personnel is critical for successful management of special status plants and natural plant communities. Figures 3 and 4 display the work force supporting the special status plant and natural plant community programs as of the end of Fiscal Year 1989 (since then several additional botanists have been hired, including ones to fill positions at the Alaska, Colorado, Montana, and Wyoming State Offices). Nine states have botanists or their equivalents in the State Office. Two of these State Office botanists are not only responsible for program coordination but are also the principal on-site contacts for program operations throughout the entire state. Another State Office botanist is, in addition to being responsible for special status plants and natural plant communities, responsible for coordination of his state's rangeland monitoring program.

District personnel assigned botanical duties spend, on the average, 13 percent of their time on special status plants and 6.5 percent on natural plant communities. A strong pro-active program requires more time and expertise than is currently available.

Table 9 displays the numbers of permanent, qualified personnel required for each state to accomplish the goals of both the special status plant and natural plant community programs. The BLM needs at least 145 qualified people to carry out this strategy. Currently, the BLM employs 32 botanists. State Office personnel will be necessary for program coordination, budget development, and preparation of cooperative agreements with other organizations and agencies. Personnel

Table 9.
Full time botanists needed to implement this strategy.

	Number of Full Time Botanist Positions		
State/Office	Present	Target	Need
AK	1	6	5
AZ	1	9	8
CA	10	22	12
CO	1	10	9
ID	2	15	13
MT	1	13	12
NM	1	8	7
NV	1	10	9
OR	10	31	21
UT	1	12	11
WY	2	5	3
PTC [1]	0	1	1
SC [2]	1	2	1
WO [3]	1	1	0
Total	33	145	112

[1] Phoenix Training Center.
[2] Service Center (Denver).
[3] Washington Office.

qualified in botany, plant population biology, and plant community ecology will be needed at the field level to develop and implement management, inventory, and monitoring programs. Adequate staffing will reduce the need for costly recovery programs; provide for more effective management of consumptive resource programs such as timber, mining, and grazing; preclude the listing of special status plants by Federal and state governments; and help maintain or enhance the current biological diversity of the public lands.

These personnel should have a background in plant taxonomy and plant ecology, including formal college training and course work related to these subjects. Beyond this basic standard, the knowledge, skills, and abilities required for botanist positions will differ depending on whether principal duties involve special status plants or natural plant communities. Personnel whose major role will be to work in the special status plant program should be well qualified in floristics (the study of the kinds of plants — the floras — of given areas) and plant autecology (the study of the adaptations and behavior of individual species or populations in relation to their environment). Those whose duties will be primarily associated with natural plant communities should have backgrounds in plant synecology (the study of plant communities, including their description, classification, and dynamics).

Although it is important to note that the staffing needs given in the following strategies (which will include botanists and plant ecologists) are for meeting the needs of the special status plant and natural plant community programs *only*, botanists and plant ecologists can be valuable assets to many other programs. They can, for example, help develop and implement revegeta-

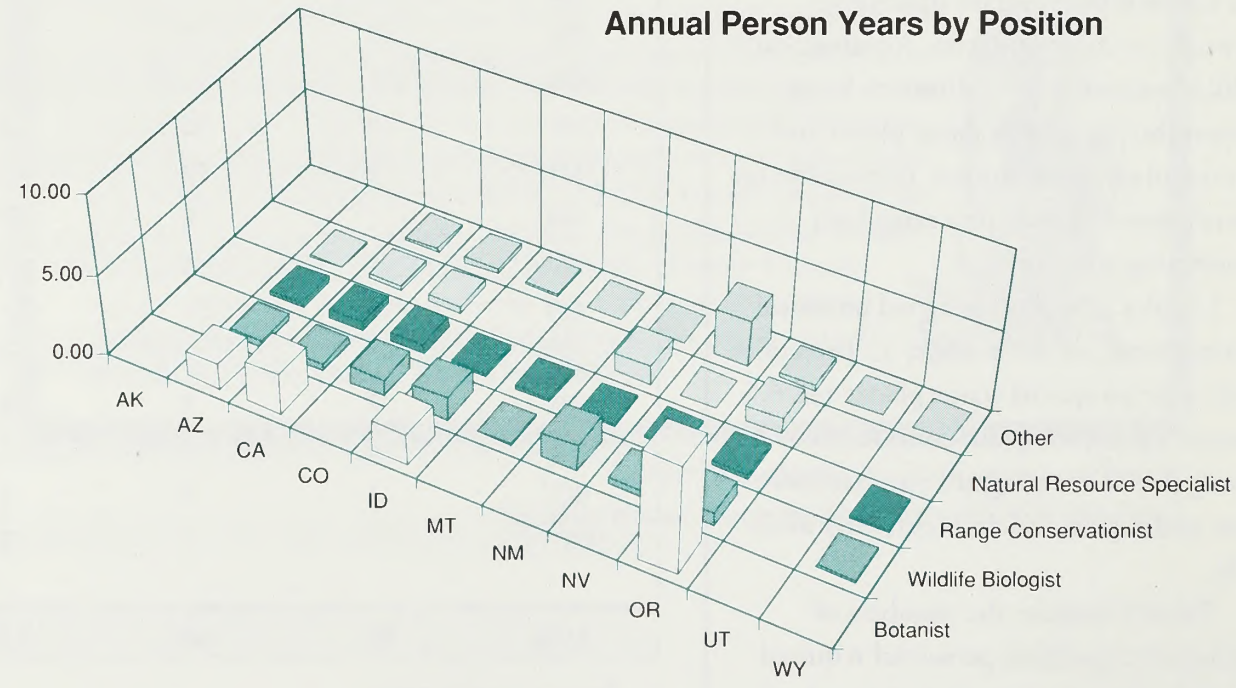


Figure 3. Person years expended annually by position for management of special status plants. Based on Fiscal Year 1989 data.

Recommended Strategies

tion plans for disturbed areas such as mines and pipelines; plan and conduct vegetation monitoring studies in support of the grazing, wildlife, and forest management programs; and assist in the BLM's riparian initiative. Botanical expertise is important to all of these programs and more. But staffing needs for these purposes are over and above those given in this strategy.

It is equally important to note that botanists and plant ecologists alone cannot make a viable program. Expertise in the management of ecosystems is also required. Basic soils, range, wildlife, and forestry support will be needed. Because these base programs are already fully committed, it will be necessary to supplement these programs as well.

1. Develop prototype vacancy announcements including the sections on knowledge, skills, and abilities (KSAs) that establish minimum levels of training and experience in botany, plant ecology, and plant taxonomy for program personnel who will be working in the special status plant program. Develop announcements for those working in the natural plant community program as well.
2. Provide training in policy, program responsibilities, techniques, and resource values to program professionals and managers.
3. Develop policy and procedures for maintaining and improving staff professionalism, including guidance on continuing education, conducting research, and publishing papers.
4. Increase staff to 145 qualified personnel.
5. Use the Cooperative Education program to enlist and train new personnel.

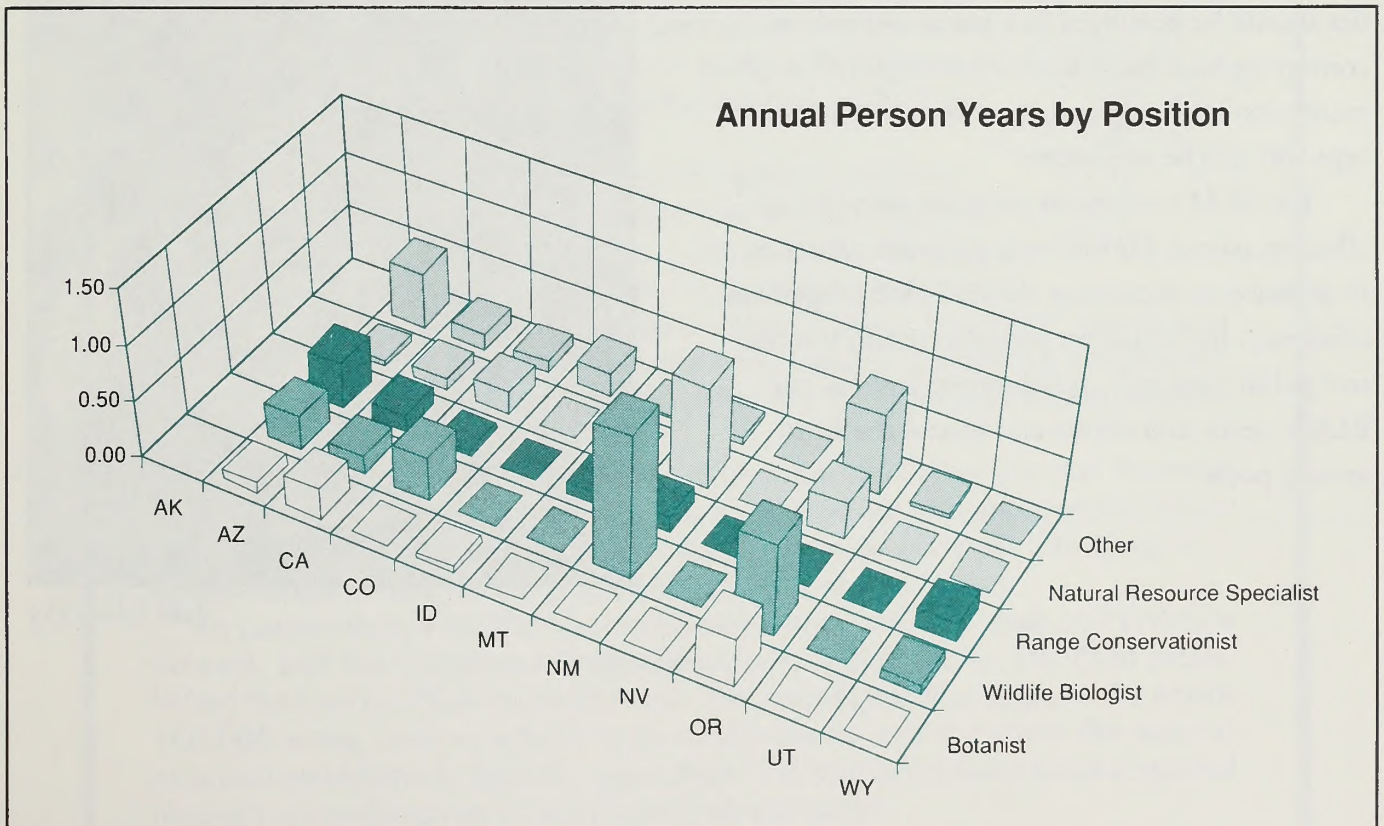


Figure 4. Person years expended annually by position for management of natural plant communitites. Based on Fiscal Year 1989 data.

Awareness

GOAL 1. Promote Program Support: Increase program awareness to gain the support of both internal and external groups.

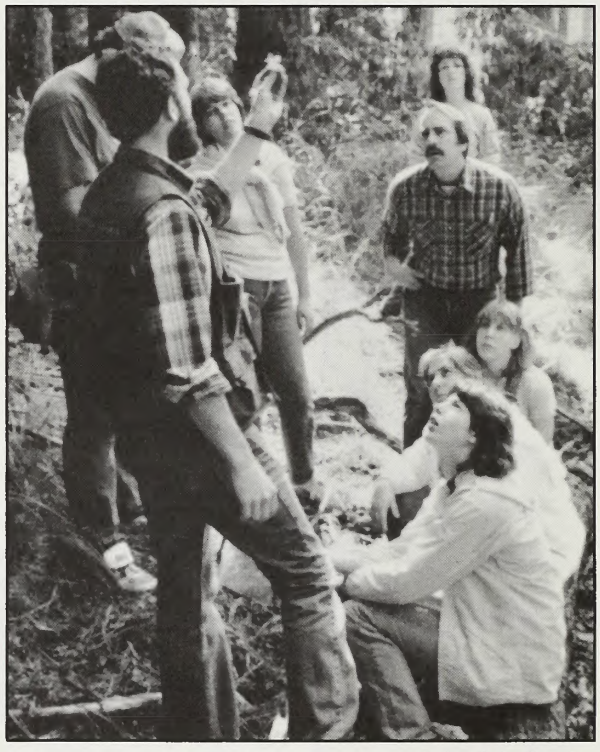
Management Opportunities

Awareness of the special status plant and natural plant community programs and their benefits is crucial to secure support from within the BLM, other Federal and state agencies, and public and private conservation groups and organizations. The effectiveness of resource conservation programs can only be improved by producing pro-active internal and external education programs. Increasing the visibility of special status plant and natural plant community management on public lands will strengthen support for sound land use decisions by BLM managers and generate external understanding and support for these programs. Conservation of special status plants and representative natural plant communities should be portrayed as a major element in conserving biological diversity, though full implementation of the desired plant community concept will also be important.

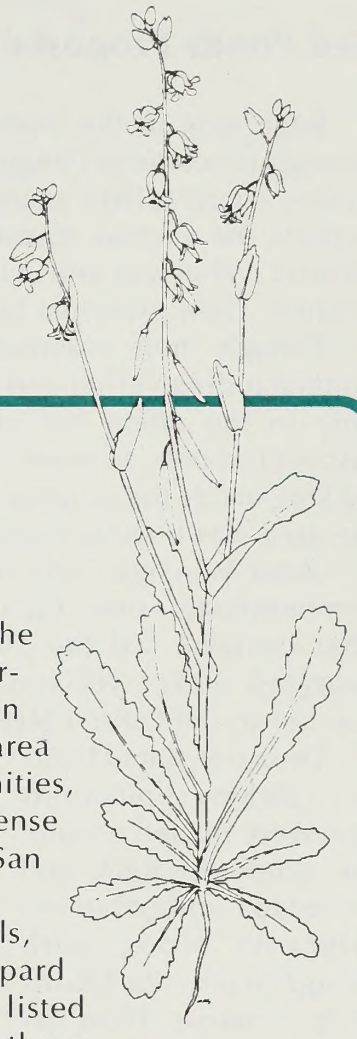
The BLM's volunteer program provides an effective avenue for fostering program awareness. In addition to increasing the BLM's management efficiency, the volunteer program results in effective public outreach, as volunteers learn of the BLM's needs and efforts and spread the word among peers.

Recommended Strategies

1. Develop and implement outreach plans at both the headquarters and State Office levels to improve public understanding of the need to protect and manage special status plants and natural plant communities. The plan should emphasize program benefits to public users.
2. Develop and implement an internal information plan for BLM employees to explain the need to protect and manage special status plants and natural plant communities.



Jake Jakabosky



Carrizo Plain Natural Area

The Carrizo Plain Natural Area, lying adjacent to the southwestern edge of the San Joaquin Valley in California, is the largest remaining representation of the San Joaquin Biogeographic Province. The 180,000 acre area is a diverse complex of several distinct plant communities, most of which are now relatively rare as a result of intense agriculture, oil development, and urbanization in the San Joaquin Valley.

The area is home to several endangered animals, including the San Joaquin kit fox, the blunt-nosed leopard lizard, and the giant kangaroo rat. Three Federally listed threatened and endangered plants are also found there: California jewelflower (*Caulanthus californicus*), Hoover's wooly-star (*Eriastrum hooveri*), and San Joaquin wooly-threads (*Lembertia congdonii*). In addition, the area contains seasonal habitat for more than 6,000 sandhill cranes.

Separated from the floor of the San Joaquin Valley by the Temblor Range, its size, resource values, isolation, and relatively undisturbed nature make the Carrizo Plain ideal as a natural area to promote the long-term conservation of the vanishing San Joaquin flora and fauna.

In partnership with The Nature Conservancy, the U.S. Fish and Wildlife Service, and the California Department of Fish and Game, the BLM established the Carrizo Plain Natural Area. The major goal is to acquire the entire 180,000 acres, most of which were in private ownership when the natural area was established. To date, more than 100,000 acres have been acquired through a combination of purchase and exchange.

California jewelflower (*Caulanthus californicus*) by Mary Ann Showers

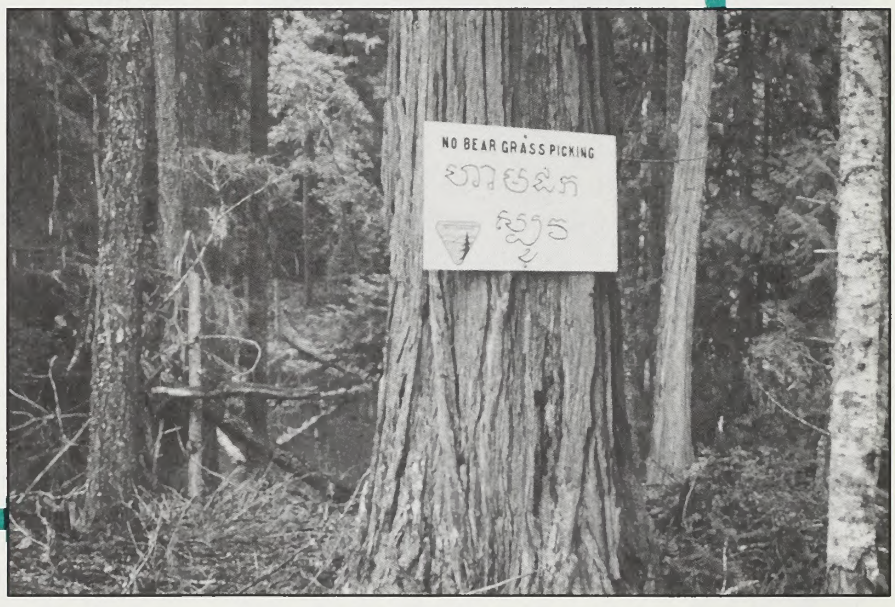
Red Ponds Proposed RNA

Beginning in the winter of 1988, large numbers of Southeast Asian immigrants came to Oregon's Roseburg District Office to purchase permits so they could collect beargrass (*Xerophyllum tenax*) on BLM lands. Selling permits for various forest products was not unusual for the Roseburg District. What was unusual was dealing with people who knew little if any English. Their principle language was Cambodian.

Though their intentions were good, the immigrants had difficulty understanding verbal and written instructions. This created problems not only in the office but also in the field. Beargrass picking was soon discovered outside permit areas. District monitoring discovered beargrass picking inside the proposed Red Ponds Research Natural Area even though the area was heavily signed.

Area Manager Dave Baker decided to make an even greater effort to communicate rather than to discontinue issuing permits for beargrass. That decision led the District public affairs officer to Terry Thou, a beargrass picker who was a former educator in Cambodia and an English teacher in the United States.

Thou translated beargrass picking stipulations that were posted around the proposed RNA and issued to Cambodian immigrants along with beargrass permits. On his own initiative, Thou began to promote the BLM public land ethic among his colleagues. Violations quickly disappeared.



Mel Ingeroi

Layne's butterweed (*Senecio layneae*)
by Mary Ann Showers

Conclusions

Daniel Lee Brown

The BLM has made tremendous strides, particularly within the last decade, toward integrating the management of special status plants and natural plant communities into its overall resource management mission. The 1990s bring significant challenges and opportunities. Increased action during this decade is critical if the BLM is to achieve the *Fish and Wildlife 2000* goals of conserving special status plants and natural plant communities.

Table 8 summarizes the planned strategies and associated costs for the natural plant community program. Table 10 is a similar summary for the special status plant program. An implementation schedule is given in Appendix C.

Table 10.
Recommended strategies for special status plant management and the workmonths and costs necessary for implementation.

Strategy	Units Needed	Workmonths Needed	Funding Needed
Inventory	100,682,000 acres	5,636	$22,559,000
Monitoring	1,100 plants	2,096	6,450,000
Habitat Improvement	244 plants	766	3,279,000
Research and Studies	532 studies	1,243	5,366,000
Activity Planning	498 plans	1,186	3,881,000
Habitat Acquisition	105,370 acres	*	*
Total		10,927	41,535,000

* It is anticipated that most of this acquisition can be accomplished through land exchanges. Therefore, no costs associated with this effort are identified in this document.

The BLM and the Congress must be committed to the conservation of special status plants and natural plant communities. This commitment must include a substantial increase in the investment in these programs. As Table 11 illustrates, the special status plant and natural plant community programs require about five-fold and seven-fold increases, respectively, in their annual budgets.

An increase in qualified personnel is also necessary. The number of BLM botanists, plant ecologists, and other qualified personnel should be increased to 145. Additional support personnel will also be needed.

Finally, even with additional money and personnel, the BLM will be unable to accomplish these vital tasks without the full support of its partners. In pursuing new partnerships, the BLM must effectively communicate the importance of these goals. Outreach plans will improve the public's awareness and serve to promote these programs.

Table 11.
Fiscal year 1989 expenditures for special status plants and natural plant communities compared to annual needs for each year of the 1990's.

	Expenditures			
	Special Status Plants		Natural Plant Communities	
State	FY 1989 [1]	Annual Need 1990's	FY 1989 [1]	Annual Need 1990's
AK	$ 0	$ 440,000	$ 0	$ 226,000
AZ	60,000	222,000	15,000	76,000
CA	158,000	796,000	52,000	267,000
CO	83,000	207,000	56,000	132,000
ID	38,000	280,000	5,000	67,000
MT	0	438,000	4,000	108,000
NM	32,000	411,000	32,000	121,000
NV	37,000	181,000	6,000	61,000
OR	350,000	978,000	62,000	680,000
UT	80,000	100,000	10,000	21,000
WY	10,000	100,000	10,000	5,000
Total	848,000	4,153,000	252,000	1,764,000

[1] Values are estimates; budget tracking system does not isolate expenditures for special status plants or natural plant communities.

Partnerships - The Nature Conservancy in New Mexico

New Mexico has completed nearly all of its Resource Management Plans (RMPs). Each plan has its own unique character, but one consistent element in the plans has been the interest and cooperation of The Nature Conservancy (TNC) in providing information to enable the BLM to assess potential Areas of Critical Environmental Concern, Research Natural Areas, or other areas that contain rare and unique communities, habitats, and species. This information is used in the land use planning process to support the designation of such areas. Designation represents a management commitment to give priority to the rare plant or plant communities in that area.

TNC has participated in the planning process for areas throughout the state to lend support for ACEC designation for unique plant communities and rare plant habitat. The BLM's Challenge Cost Share program has given the planning process a tremendous boost in recent years, funding extensive survey efforts by TNC to gather data on the unique botanical resources of each planning area. With the help and support of TNC's groundwork, the BLM has designated many areas in New Mexico through the land use planning process that will be managed to maintain and enhance populations of special status plants and natural plant communities. More such areas will be designated through RMPs currently under preparation.

Appendix A
Laws, Regulations, and Policies

The following laws, regulations, and policies provide the foundation for management of special status plants and natural plant communities on public lands.

Federal Land Policy and Management Act. Declares that the policy of the United States is to manage the public lands in a manner that will protect the quality of scientific, ecological, and environmental values and that will protect certain public lands in their natural condition. Provides for the designation of Areas of Critical Environmental Concern (ACECs) to protect and prevent irreparable damage to important resource values, including fish and wildlife resources and other natural systems or processes. Requires that an inventory of all public lands and their resource and other values be prepared and maintained on a continuing basis.

Endangered Species Act. Requires that all Federal agencies use their authorities to carry out programs for the conservation of endangered and threatened species, including the ecosystems on which these species depend.

National Environmental Policy Act. Declares it to be the policy of the United States to encourage productive and harmonious relationships between man and his environment and to enrich the understanding of ecological systems and natural processes important to the nation. Requires that actions taken or permitted by Federal agencies be analyzed to determine their effects on the environment.

Title 43, Code of Federal Regulations, Part 24. Sets forth the Department of the Interior's Fish and Wildlife Policy. Declares that it is the intent of the Secretary of the Interior to strengthen and support the missions of the states to conserve and manage effectively the nation's fish and wildlife. For the BLM, this includes conservation and rehabilitation of fish and wildlife and their habitat.

BLM Manual 6500. Declares that it is BLM policy to manage habitat with emphasis on ecosystems to ensure self-sustaining populations and a natural abundance and diversity of wildlife, fish, and plant resources on the public lands. States that to carry out the above policy the BLM will do inventory, planning, research, monitoring, and maintenance; will communicate, cooperate, and automate; and will hire professional staff.

BLM Manual 6840. Establishes the BLM's primary policy on the management of special status species, including plants. Has provisions for each type of special status species:

Federal Threatened and Endangered Species. Requires the BLM to conserve Federally listed threatened and endangered species and the ecosystems upon which they depend and to ensure that authorized actions do not adversely affect such species.

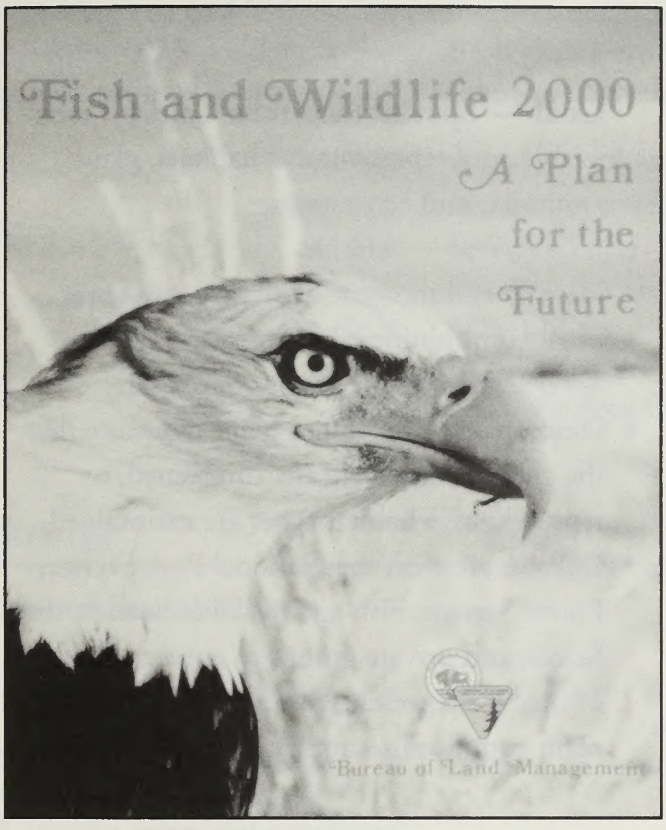
Proposed Species. Directs the BLM to manage proposed species with the same level of protection provided for Federally listed species.

Candidate Species. Requires the BLM to manage species identified by the U.S. Fish and Wildlife Service (FWS) as candidates for listing in such a manner that these species and their habitats are conserved and to ensure that authorized actions do not contribute to the need to list any candidate species as endangered or threatened.

Sensitive Species. Authorizes State Directors to designate sensitive species and directs the BLM to give such species, at a minimum, the same level of protection provided for candidate species.

State Listed Species. Directs the BLM to carry out programs for the conservation of state listed species.

Appendix B
Fish and Wildlife 2000 Goals and Objectives



In 1987, the BLM issued a strategic plan entitled *Fish and Wildlife 2000, A Plan For The Future.* That plan describes goals and objectives to provide a more efficient management scheme for the fish, wildlife, and plant resources on the public lands. It sets forth the direction the BLM will take with the fish, wildlife, and plant programs between now and the year 2000. Several of the goals and objectives developed in *Fish and Wildlife 2000* are specific to special status plants and natural plant communities.

Goal — Listed Species: Increase populations of Federally listed T/E plants on land managed by the BLM and restore species and populations to historic ranges.

- Develop a data base that identifies distribution of all T/E species on public lands, significance of public lands for recovery of each species, existing and potential threats to survival of these species, opportunities to improve habitat conditions, and habitat acquisition needs.
- Develop a system to track and display recovery actions, progress, and funding needs contained in recovery plans for species with habitat on BLM lands.
- Ensure completion of objectives in recovery plans that are relevant to BLM lands.
- Implement a monitoring system that will track population trends and habitat conditions, measure progress in meeting recovery objectives, evaluate compensation requirements or stipulations in authorized activities, and provide the information necessary to anticipate problems.
- Develop public information packages that show what T/E species the BLM is managing, where they and their habitats are found, what current management is, and what is needed for recovery.
- Expand cooperative efforts between the BLM, State agencies, and the Fish and Wildlife Service relating to T/E species, through such methods as training on agency responsibilities and working to increase informal and formal coordination in advance of the decision-making process.
- Evaluate species that have made significant recovery and submit down-listing packages to the Fish and Wildlife Service.

Goal — Candidate Species: Manage the habitat to maintain populations of candidate plants at a level that will avoid endangering species and the need to list any species as endangered or threatened by either a state or Federal government.

- Review development activities to ensure that management provisions are included to protect habitats of candidate species.
- Develop a data base that identifies distribution and habitat of candidate species, state listed species, species proposed for listing, and any other species on the public lands determined to be declining toward the point of endangerment, along with reasons for declines/trends and threats to survival, and opportunities for improving population and habitat conditions.
- Implement a monitoring system that will track population trends and habitat conditions, measure progress in meeting management objectives, evaluate compensation requirements or stipulations in authorized activities, and provide the information necessary to anticipate problems.

Goal — Special Habitats: Conserve rare, vulnerable, and representative habitats, plant communities, and ecosystems.

- Identify and monitor habitats/ecosystems/plant communities that are vulnerable to adverse changes or are considered rare.
- Develop and implement plans to ensure that the characteristics of rare, threatened, or representative habitat types are maintained.
- Collaborate with the National Park Service, Forest Service, Fish and Wildlife Service, the States, and private groups to ensure protection of the best representative habitats/ecosystems/plant communities for each area.

Appendix C
Implementation Schedule

Following is a schedule for implementing the strategies elaborated in this plan. Target dates and implementation priorities (with Priority 1 being the highest) are given for each strategy. The offices responsible for implementing the strategies are also shown. Office abbreviations are as follows:

WO 240	Washington Office - Division of Wildlife and Fisheries
WO 760	Washington Office - Division of Planning
SC 210	Service Center - Division of Resource Services
PTC	Phoenix Training Center
SOs	State Offices
DOs	District Offices
RAs	Resource Area Offices

Strategy	Responsibility	Target Date	Priority
Special Status Plants			
Goal 1: Inventory			
1. Develop inventory system	SC 210	1993	1
2. Conduct inventories	RAs	1992-2000	1
3. Develop automated data base(s)	SC 210	1993	1
Goal 2: Planning			
1. Update Supplemental Program Guidance	WO 240	1993	1
2. Develop and implement activity plans	RAs	1992-2000	2
3. Implement habitat improvement projects	RAs	1992-2000	2
4. Develop land adjustment plans	SOs	1993	2
5. Acquire lands	DOs/RAs	1992-2000	3
6. Develop NEPA guidance	WO 240/WO 760	1993	1
Goal 3: Monitoring and Research			
1. Develop monitoring standards	WO 240	1993	1
2. Develop technical reference	SC 210	1993	1
3. Develop policy and guidance	WO 240	1993	1
4. Develop Resource Area monitoring plans	RAs	1993-1997	3
5. Ensure LIS capability	SC 210	1993	1
6. Implement standardized recovery tracking system	WO 240	1993	1
7. Conduct monitoring studies	RAs	1992-2000	1
8. Conduct research and studies	DOs/RAs	1992-2000	2

Strategy	Responsibility	Target Date	Priority
Goal 4: Coordination			
1. Develop standard interagency and intergroup data procedures	SC 210	1993	1
2. Organize and participate in workshops	WO 240/SOs/DOs/RAs	1992-2000	3
3. Develop interagency training courses	PTC	1995	3
4. Develop action plans	SOs	1993	3
5. Develop procedures for cooperative studies	SOs	1996	3

Natural Plant Communities

Goal 1: Policy			
1. Develop policy and guidance	WO 240	1993	1
2. Appoint natural plant community coordinators	WO 240/SOs/DOs/RAs	1993	1
Goal 2: Inventory and Monitoring			
1. Develop system to identify, describe, and evaluate natural plant communities	SC 210	1994	2
2. Conduct inventories	RAs	1992-2000	2
3. Evaluate existing special areas	RAs	1992-2000	1
4. Establish objectives in land use and activity plans	DOs/RAs	1992-2000	2
5. Conduct monitoring studies	RAs	1992-2000	1
6. Ensure LIS capability	SC 210	1993	1
Goal 3: Planning			
1. Update Supplemental Program Guidance	WO 240/WO 760	1993	1
2. Develop and implement activity plans	RAs	1992-2000	2
3. Conduct research and studies	DOs/RAs	1992-2000	2
4. Develop acquisition plans	SOs	1993	2
5. Acquire lands	DOs/RAs	1992-2000	3
Goal 4: Coordination			
1. Develop procedures for cooperative studies	SOs	1995	2
2. Organize and participate in workshops	WO 240/SC 210/SOs/DOs/RAs	1992-2000	3
3. Develop system to manage across jurisdictional boundaries	SOs/DOs/RAs	1993	2

Strategy	Responsibility	Target Date	Priority
Personnel			
Goal 1: Adequate Staffing			
1. Develop prototype vacancy announcement and KSAs	WO 240	1993	1
2. Provide training	PTC/SOs/DOs/RAs	1992-2000	2
3. Develop policy and procedures for improving staff professionalism	WO 240	1993	2
4. Increase staff to 145 qualified personnel	WO 240/SOs/ DOs/RAs	1996	1
Awareness			
Goal 1: Promote Program Support			
1. Develop outreach plans	WO 240/SOs	1993	3
2. Develop internal awareness plan	WO 240	1993	3
3. Implement outreach and internal awareness plans	WO 240/SOs	1993-2000	3

Appendix D
Glossary

Activity Plan. Any of several types of BLM plans that guide certain or (in the case of Coordinated Resource Management Plans) all activities within a geographic area. The area covered is generally much smaller than the area covered by a Resource Management Plan (RMP). The goals, objectives, and management actions of an activity plan are more detailed than those of an RMP; they must, however, conform to the more general guidance of the applicable RMP. Examples of activity plans are allotment management plans, habitat management plans, recreation area management plans, and coordinated resource management plans.

Area of Critical Environmental Concern (ACEC). An area designated under the authority of the Federal Land Policy and Management Act of 1976 to protect natural resources, systems, or processes that have more than local significance or have qualities or circumstances that make them rare, irreplaceable, or vulnerable to adverse change.

Biological Diversity. The variety of life and its processes. It includes the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.

Candidate Plant. A plant species under review by the Fish and Wildlife Service for listing as threatened or endangered.

Challenge Cost Share Agreement. A formal agreement between the BLM and one or more non-Federal entities to share the costs of completing a project on BLM lands. A certain dollar amount of money is appropriated annually to the BLM's Wildlife Program (which includes special status plants and natural plant communities) to be used through Challenge Cost Share Agreements. The BLM may also commit other dollars to projects funded through these agreements.

Desired Plant Community. Of the several plant communities that may occupy an ecological site, the one that has been identified through a management plan to best meet the plan's objectives for the site.

Federally Listed Plant. A plant species listed as threatened or endangered pursuant to the Endangered Species Act of 1973, as amended.

Geographic Information System (GIS). An information system containing data which are referenced in a spatial context. It is a generic term to describe the technology or programs designed to store, retrieve, analyze, and display geographic, socioeconomic, and other types of spatial data.

Land Information System (LIS). The term used by the BLM to describe the automated

Abbreviations

ACEC	Area of Critical Environmental Concern
DPC	Desired Plant Community
GIS	Geographic Information System
LIS	Land Information System
NEPA	National Environmental Policy Act
ONA	Outstanding Natural Area
RMP	Resource Management Plan
RNA	Research Natural Area
SMA	Special Management Area

linkage of all geographically based records and resource data into a common system tied to legal descriptions of land parcels. The BLM is using computerized GIS technology to link these data sets.

Natural Plant Community. A plant community that has not been substantially altered by human activity or that is managed to minimize the effects of human disturbance.

Outstanding Natural Area (ONA). A designation intended to preserve the natural features of an area for the purpose of recreation. Current policy requires that ONAs also be designated as Areas of Critical Environmental Concern.

Plant Community. An assemblage of plants occurring together at any particular point in time. The plants that are part of a plant community are dependent on their environment and influence one another and modify their environment. They form, together with their common habitat and other associated organisms, an ecosystem.

Rare Plant. Any plant species, regardless of its official designation, that is limited in its distribution. It may be rare naturally or as a result of human impacts.

Recovery Plan. A document prepared by the Fish and Wildlife Service to guide the recovery of a Federally listed plant or animal.

Research Natural Area (RNA). A designation imparted on an area to preserve its natural features for the purposes of research and education. Current policy requires that RNAs also be designated as Areas of Critical Environmental Concern.

Resource Management Plan (RMP). The basic land use plan that guides the management of BLM lands within a given geographical area (usually corresponding to the boundaries of a BLM Resource Area). The RMP sets forth the overall goals, objectives, and management actions for the planning area and provides the framework for more detailed activity plans.

Sensitive Plant. A plant species designated as sensitive by a BLM State Director. Receives at least the same attention as a candidate plant.

Special Area. A generic term used to indicate an area that has received a special management designation, including Area of Critical Environmental Concern, Research Natural Area, Outstanding Natural Area, or Special Management Area.

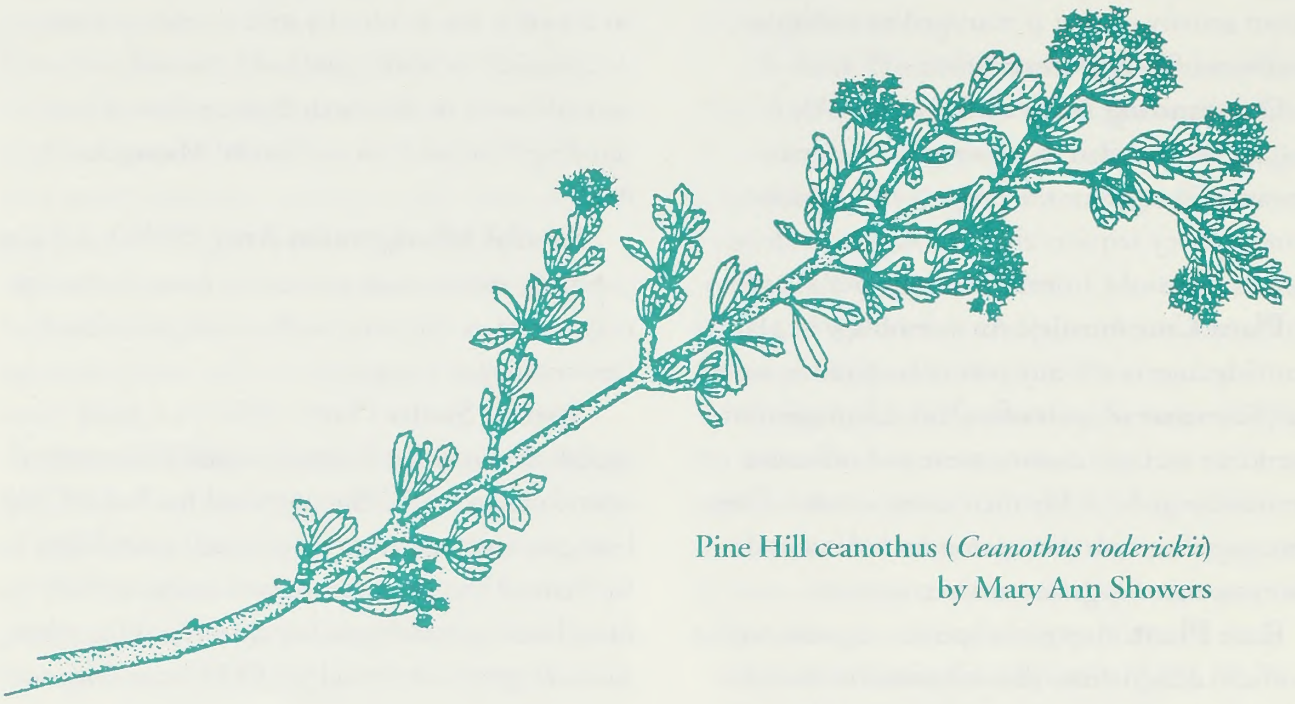
Special Management Area (SMA). An area requiring special management or focus. It may or may not meet the criteria of an Area of Critical Environmental Concern.

Special Status Plant. Refers to a plant species that is either Federally listed as threatened or endangered, officially proposed for Federal listing as endangered or threatened, a candidate for Federal listing as endangered or threatened, State listed as endangered or threatened (or other such category), or listed by a BLM State Director as sensitive.

State Listed Plant. A plant species listed as threatened or endangered (or in some other category implying the same thing) pursuant to State law.

Supplemental Program Guidance. The portion of the BLM Manual that guides the development of Resource Management Plans. It establishes the kinds of information that should be gathered and analyzed during RMP preparation and the subjects that must be addressed in the RMP.

☆U.S. GOVERNMENT PRINTING OFFICE: 1992-688-547



Pine Hill ceanothus (*Ceanothus roderickii*)
by Mary Ann Showers

8852

WER'S CARD

092

natural plant
: a strategy

ER	OFFICE	DATE RETURNED

(Continued on reverse)

BLM LIBRARY
SC-653, BLDG. 50
DENVER FEDERAL CENTER
P. O. BOX 25047
DENVER, CO 80225-0047

Federal Recycling Program
Printed on Recycled Paper